DOCUMENT RESUME

ED 451 379 CE 081 527

TITLE	Lifelong Learning NCES Task Force: Final Report, Volume II. Working Paper Series.
INSTITUTION	National Center for Education Statistics (ED), Washington, DC.
REPORT NO	NCES-WP-2000-16b
PUB DATE	2000-07-00
NOTE	368p.; For Volume I, see CE 081 526.
AVAILABLE FROM	ED Pubs, P.O. Box 1398, Jessup, MD 20794-1398. Tel: 877-433-7827 (Toll Free). For full text: http://www.nces.ed.gov/pubs2000/20016b.pdf.
PUB TYPE	Reference Materials - General (130)
EDRS PRICE	MF01/PC15 Plus Postage.
DESCRIPTORS	Adult Education; *Adult Learning; Adult Students; Change Strategies; Colleges; Competency Based Education; Corporate Education; Cost Effectiveness; Data Analysis; *Data Collection; Economic Change; Education Work Relationship; Educational Benefits; Educational Finance; Educational Objectives; *Educational Research; Educational Technology; Employer Employee Relationship; Employment Qualifications; Information Needs; Job Skills; Labor Market; *Lifelong Learning; Literature Reviews; Longitudinal Studies; National Surveys; Needs Assessment; Organizational Development; Performance Based Assessment; Population Trends; Postsecondary Education; Program Evaluation; Research Design; *Research Methodology; *Research Needs; School Business Relationship; Skill Development; Student Needs; Tables (Data); Technological Advancement; Theory Practice Relationship; Training Methods; Trend Analysis; Universities
IDENTIFIERS	Information Age; National Center for Education Statistics; Task Force Approach

ABSTRACT

This document contains the eight appendixes from the National Center for Education Statistics's (NCES's) final report on lifelong learning in the United States. Appendix A discusses the considerations that entered into the formulation of the definition of lifelong learning adopted for the NCES study. Appendix B, "Literature Review on Lifelong Learning" (Sean Creighton, Linda Shafer, Shannon M. Blaney), examines the literature on the context, process, and provision of lifelong learning and lists 47 references. Appendix C presents the following commissioned papers, all of which contain substantial bibliographies: "Social, Demographic, Economic, and Technological Trends Affecting Lifelong Learning" (David Billis); "The Higher Education Provider in the Information Age: Data Implications" (David R. Powers); "An Analysis of Four Workplace Trends and Their Implications for Data Collection" (Bonalyn J. Nelsen); and "Informal and Avocational Learning" (Barbara H. Butler). Appendix D contains a list of members of the technical review panel, a meeting summary, and a background report. Appendixes E-H contain the following items: a list prioritizing issues in 12 areas; overviews of the data collection procedures used in 18 national surveys pertinent to lifelong learning; an exploration of 12 conceptual and measurement issues; and summaries of the task force meetings on data availability. (MN)

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ED 451 379

NATIONAL CENTER FOR EDUCATION STATISTICS

Working Paper Series

Lifelong Learning NCES Task Force: Final Report, Volume II

Working Paper No. 2000-16b

July 2000

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Suggested Citation

U.S. Department of Education. National Center for Education Statistics. *Lifelong Learning NCES Task Force: Final Report, Volume II*, Working Paper No. 2000-16b, by the NCES Lifelong Learning Task Force. Washington, DC: 2000.

July 2000

Foreword

In addition to official NCES publications, NCES staff and individuals commissioned by NCES produce preliminary research reports that include analyses of survey results, and presentations of technical, methodological, and statistical evaluation issues.

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Lifelong Learning NCES Task Force:

Final Report,
Volume II

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Prepared for:

U.S. Department of Education
Office of Educational Research and Improvement
National Center for Education Statistics

July 2000

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Appendix A:
Definition of Lifelong Learner

A lifelong learner is typically defined as any adult who is involved in learning activities other than compulsory (K–12) education. This includes those involved in voluntary learning activities, as well as in activities that are required for legal, professional or other reasons. This definition, however, requires the further explication of two terms—"adult" and "learning activities." Elsewhere in this report, we discuss the various types of activities that may or may not be counted as "learning" activities. Here, we focus on who counts as an "adult."

Two factors need to be considered in determining "adult" status for lifelong learning. Age is the first factor. Because there is interest in those outside of the compulsory education system, it is logical to restrict "adults" to those of age 16 or older, since, in every state, the maximum age for compulsory school attendance is age 16 or older.[1] The second factor is postsecondary enrollment. The definition of lifelong learner as stated above would include all postsecondary students. Some analysts, however, prefer to exclude the "traditional" postsecondary student, on the grounds that these students—variously defined as those under age 25, those attending full-time, or those attending directly from high school—are different from "regular" adults. For example, the "traditional" postsecondary student is usually financially dependent on his or her parents, eligible for federal financial aid programs that are not available to part-time students, and/or less likely to be in the workforce.

We decided to maintain some flexibility with regard to postsecondary students. For some analyses, it may make sense to include all postsecondary students as part of the adult population. In this case, an adult would be defined as indicated above—anyone age 16 or older who is no longer enrolled in a compulsory education program. In other situations, it may be more sensible to exclude the "traditional" postsecondary student, which we define as those who enter full-time postsecondary programs directly from high school (i.e., those postsecondary students most likely to be financially dependent on their parents and not in the labor force). In this latter case, an adult would be defined as anyone age 16 or older who has not been continuously enrolled full-time in an education program since leaving high school. Table A.1 compares our definition of lifelong learner with that currently used in the two NCES data collection surveys that have the most direct relevance to lifelong learning (NHES/AE and ILSS).

Table A.1—Different approaches to defining lifelong (or adult) learners

High school leaver with:	**Counted as "lifelong learner"?**		
	NHES	**ILSS**	**Task Force**
Delayed entry to part-time postsecondary	yes	yes	yes
Delayed entry to full-time postsecondary	no	yes	yes
Direct entry to part-time postsecondary	yes	no	yes
Direct entry to full-time postsecondary	no	no	sometimes

To allow analysts to develop indicators based on our definition of lifelong learners, the following information must be available on each relevant survey: age of respondent, respondents' education attainment level, respondent's current postsecondary status, and, if enrolled full-time in postsecondary education, whether the respondent has been so enrolled since leaving high school. One pattern of questions to identify lifelong learners would be as follows (other patterns of questions may be possible):

---

[1] *Digest of Education Statistics*, 1998, p. 159, Table 152.

Age of respondent:
Less than 16? → not a lifelong learner
16 or older? → continue

- Education attainment level
  If less than high school and
  - Enrolled in K–12 education program (*not* GED or other alternative high school completion program for drop-outs)? → not a lifelong learner
  - Not enrolled in K–12 education program → continue

  If high school diploma or higher, and
  - Currently enrolled in postsecondary education program
    - *Enrolled part-time → Lifelong learner*
    - Enrolled full-time → continue
      - Enrolled continuously since high school?
        - *No → Lifelong learner*
        - Yes → Lifelong learner only under broader definition
- Not currently enrolled in postsecondary program, and
- *Engaged in learning activity elsewhere → Lifelong learner*
- Not engaged in other learning activity → not a lifelong learner

Appendix B:
Literature Review

LITERATURE REVIEW ON LIFELONG LEARNING

Sean Creighton, Linda Shafer, and Shannon M. Blaney,
Education Statistics Services Institute, Washington, DC

September 29, 1999

I. Introduction

Lifelong learning is a topic of interest to political leaders, policymakers, researchers, and the higher education community. Lifelong learning is the subject of a recent major policy report (Commission for a Nation of Lifelong Learners 1998) and was the topic of a White House conference on January 12, 1999, organized by Vice President Gore, *21st Century Skills for 21st Century Jobs*. Goal 6 of the National Education Goals concerns this topic:

> Goal 6: Adult Literacy and Lifelong Learning—By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

The purpose of this paper is to present a literature review that will serve as a background document for a wider discussion about the role of NCES in data development on the topic of lifelong learning. It is not an exhaustive report and will not cover all the sources of data presently available or all sources of information on the topic. Information about data is restricted to nationally representative data sources, primarily collected by agencies of the federal government. For the purpose of this paper, lifelong learning or adult learning (the terms will be used interchangeably) includes learning activities, excluding full-time schooling (unless noted), engaged in by persons who are older than the age required for compulsory school attendance. Where data analyses are reported, respondents are not included if they were full-time students in postsecondary institutions. The main topics discussed include the rationale for making lifelong learning a national priority, the way in which adults learn, characteristics of adult learners, participation rates, types of educational programs, reasons for participation, barriers to participation, access, and federal policies (attachment A). While lifelong learning as leisure activity is an interesting topic and may be of concern to the population of aging Baby Boomers, it is not the primary focus of this review. Rather, the emphasis is on economic wellbeing and competitiveness for individuals and the nation as a whole.

The importance of adult learning to the welfare of the nation and its citizens can be seen by an examination of conditions that affect the United States, its economy, and its workers. Three sets of conditions affect the direction of adult learning in the United States: (1) the imperatives of the global economy, (2) the impact of technology, and (3) demographic trends, including the ongoing needs of a democratic society and an informed citizenry. Background papers for the Commission for a Nation of Lifelong Learners and for the NCES Lifelong Learning Task Force discuss how each of these three sets of conditions directly influences the educational needs of adults (Lehmann and Maehl 1995; Bills 1998). Lehmann and Maehl (1995) also take into account the structural, institutional, and individual barriers to lifelong learning. Emerging educational needs and barriers are reviewed in five policy areas, which represent the key stakeholders in shaping higher education policy. These policy areas are public policy, business policy, labor policy, higher education policy, and philanthropic policy. The structure of this section closely follows that developed by Lehmann and Maehl; however, the focus is not solely on higher education.

Three major commissions have reported on the subject of lifelong learning over the past 30 years. These include the Gould Commission (Commission on Non-Traditional Study 1973), the Commission on Higher Education and the Adult Learner (1984), and most recently, the Commission for a Nation of Lifelong Learners (1998). Key findings and recommendations of the earlier two commissions have been summarized as follows (Lehmann and Maehl 1995):

1. Both society and institutions are in considerable ferment.
2. Adult learners are both distinctive and important, and there are qualitative differences between them and younger students. Such differences in large measure are neglected by the traditional educational system.
3. There are twin goals of social need and social equity in providing for adult learners.
4. Approaches to change should be evolutionary, respecting the heterogeneity and variety of the American educational system.
5. Changes should be made to better provide for adult learners, but a continuing commitment to the education of younger students should be maintained.

The recommendations of the most recent commission reflect the fact that many of the same issues are pertinent today. The overarching recommendation of the Commission for a Nation of Lifelong Learners is that opinion leaders, education providers, policymakers, and the public must recognize lifelong learning as a national priority.

Other recommendations include the following:

1. Acknowledge and promote the link between universal lifelong learning and America's position in the global economy.
2. Ensure equity of access to lifelong learning.
3. Exploit effectively new technologies for lifelong learning.
4. Advance lifelong learning by rethinking and reorganizing the delivery of education and training.
5. Make resource commitments to lifelong learning commensurate with its national importance.

The question that arises is why is lifelong learning so important to the wellbeing of the nation and its citizens? The answer can be gleaned through an examination of the economic and social conditions facing the United States and its training and education systems.

A. The Imperatives of the Global Economy

Highly industrialized societies have undergone an enormous shift in their economic structures in the last 3 decades. This transformation has brought forth a new vocabulary, including the terms postindustrial society, postmodern society, and the information society. One of the key factors in this transformation is that we now live in a country where the proportion of workers earning their living from manual or physical labor is a distinct minority. Learning and knowledge drive the information society. The effect of this transformation is the subject of a vigorous debate. Optimists believe that the information age will bring about unprecedented opportunities for learning and the expansion of knowledge. Pessimists believe that the expansion of the global market, global competition, and advances in production technology will bring about a decline of well-paid jobs for the working and middle class and an increasingly wider income gap between those with more education credentials and those who have little education. Of course, both predictions could happen simultaneously. The information age might bring about increased opportunities for those with advantages and access, as well as diminish prospects for those who face obstacles.

Three key workplace changes are occurring as a result of employers' attempts to compete in a global economy: (1) a restructuring of the economy from manufacturing towards service industries; (2) the bifurcation of jobs into de-skilled jobs and upgraded, more complex ones; and (3) an increase in the use of part-time, temporary, and contract workers (Barley and Orr 1997).

In the new workforce, there will be increasing proportions of professional and technical "knowledge" workers. Professional workers will require high levels of education—baccalaureate and advanced degrees—while technical workers will generally train in 2-year colleges and continue training on the job. The confluence of the changing nature of the economy, occupational requirements, and employer-employee contract relations make frequent job and career changes much more probable. Education and preparation for new (second) careers may be more demanding than qualifying education for initial career preparation, particularly for adult workers with competing role demands.

1. Policy Implications of Economic Change

The impact of global economic conditions on adults is mediated through public policy, business policy, labor policy, higher education policy, and philanthropic policy. The key factor in public policy has been the reduction in spending on higher education compared to other areas of need (Lehmann and Maehl 1995). For business, there can be enormous returns to investment in human capital, but organizational (e.g., hierarchical structures) and financial issues must be addressed (Smith 1995; Waterman 1994). Universities and colleges can aid business in this endeavor if they rethink traditional programs and delivery systems. In terms of labor policy, the great debate is over the dual nature of the emerging labor force—those with higher education and those without. However, three-quarters of workers ages 18 and older in 1997 do not hold 4-year degrees, and there is little reason to think that this will change dramatically. Indeed, approximately 12 percent of adult workers do not have a high school diploma (U.S. Bureau of the Census, Current Population Survey 1997, from Internet table A-3, released 1998). However, the returns to education are such that changes in the number of 2- and 4-year degree holders will boost overall economic activity and individual earnings (Sticht 1998; Decker 1997).

Philanthropic organizations have exerted major influence over U.S. education policy throughout the latter part of this century (Dougherty 1994; Lehmann and Maehl 1995). With attention devoted to K–12 problems in education since the publication of *A Nation at Risk* in 1983, it may now be time for philanthropic organizations to turn their attention to adult learning. There are many unresolved issues. What works best in the area of adult learning? What relevant models exist? What is the role of technology in diffusing new forms of adult learning? What types of higher education partnerships and initiatives should be funded?

B. The Impact of Technology

In 1991, corporate spending on information technology surpassed spending on manufacturing technology for the first time (Siegfried, Getz, and Anderson 1995; Dolence and Norris 1995). Changes in the computer and telecommunications industries are rapid and continuous. Making full use of information technology demands the development of workers' intellectual skills, which presents a challenge to both industry and the education system. A recent study has shown that higher education assimilates innovations at a relatively slow pace. Colleges adopt new technology fastest, with academic innovations and financial innovations happening very slowly. Average length of time of adaptation of 25 specific innovations in education was 25 years, compared to an average length of time of 8 years in four industries in the private sector (coal, steel, brewing, and railroads) (Siegfried, Getz, and Anderson 1995). It has been suggested that this lack of innovation has made and will continue to make higher education irrelevant to business and economic growth if changes are not made (Walhaus 1998).

In addition to a tendency towards inertia, academic institutions also differ from business in their styles of operation and their priorities. The following table identifies differences between the values and practices of colleges and those of business. Differences between what is valued in the workplace and educational values and practices are difficult to generalize, but the contrasts are strong enough that they can be outlined.

Table 1—Typology of the contrasts between what is expected by employers and higher education values and practices

Expectations of employers	Higher education values and practices
Boundarylessness	Modular learning, formal course boundaries
Integration of skills across organization	Competition and individualism
Leadership	Decisionmaking by consensus
Decisiveness	Emphasis on collegiality
Just-in-time training	Formal and extended academic calendar
Flying in formation	Flying solo
Encouraging listening and inventiveness	Protecting the mores of the disciplines
Tolerance for ambiguity	Precision and stability valued
Ability to change	Cling to current practices and beliefs

Source: Walhaus 1998.

Changes in workplace skills due to new technology may require either more or less of workers than before the introduction of new technology. Some innovations require workers to learn new skills, and to use more abstract thinking, procedural reasoning, and sophisticated decisionmaking. With other new technology, tasks are "dummied down" or de-skilled, and workers' growth is not encouraged. Which outcome occurs depends to a large extent on the relative power of business versus labor, general business policy, and education policy.

New technology also poses a second challenge. That is, how do we use the new technologies in the classroom itself? The advance of electronic technology and telecommunications creates unprecedented opportunities for the adult learner (Dolence and Norris 1995). Curricular content can be stored and transmitted in electronic form. Video and audio sources can easily be integrated into the learning environment. The World Wide Web can be used for research and information gathering. New modes of delivery can ease access problems and bring learning into the reach of those not currently served. Distance learning, computer and video conferencing, e-mail, etc. can be used to create communities of learning in a way not possible if geographic restrictions exist. As Dolence and Norris (1995) point out, this means that the teaching of basic computer literacy and the skills needed to sort through the world of information is among the highest priorities in lifelong learning.

1. Policy Implications of Technological Change

New technologies are implemented within organizational structures. This points to important organizational changes that must occur within the educational sector. It has been argued that, in order to succeed, the successful organizations of the future will be "learning organizations," concentrated not on profit maximization or technology acquisition but on learning and on capitalizing on what they learn. Ironically, universities and the higher education systems in general are not the best exemplars of learning organizations. In higher education, learning tends to be narrowly structured, discrete, and isolated. The successful college of the future will be organized as a learning system in which each part (courses, classrooms, departments, laboratories, libraries, etc.) is designed to promote both individual and collective learning and put that learning into productive use. Some form of organizational benchmarking strategy will be necessary to encourage users to learn from the best in the world. In all areas of education the question should be, Is our educational culture and our approach to teaching and learning outmoded and infused by old mindsets? How can we invest in training and education to promote the highest standards and increases in learner productivity? What are the benchmarks and best practices that should be adopted? (See Dolence and Norris 1995.)

The new economy and the technological revolution have many consequences for labor (Barley and Orr 1997). The growing proportions of professional and technical workers in the labor force put the onus on educational institutions to develop and enhance their curricula in information technology. For labor issues, where equity and access are of the utmost importance, the only way to bridge the gap between the winners and losers in the information age is by ensuring that workers are information-literate and have access and skills to use increasingly sophisticated hardware and software. The growth in technical work in the economy also suggests that the role of community colleges be examined carefully to see if they are producing the quality and quantity of technically trained workers that the economy demands (Dougherty 1994).

For education policy, a key focus is integration. What is the best way to integrate the new technological developments across academic disciplines? How might integration be achieved across occupational and professional fields? What are the innovative approaches that link education and work? Successful efforts in all these areas need to be studied and the results disseminated.

In addition, sources of support need to be identified. Historically, philanthropic foundations have provided the impetus for innovation in the higher education sector (Dougherty 1994, 3; Brint and Karabel 1989). The American Association of Community Colleges has received numerous grants from the Kellogg foundation to support community colleges towards technical/vocational education. The Commission for a Nation of Lifelong Learners (1998) suggests that it is now time for the foundations to reconsider their funding priorities and put adult learning back on the national policy agenda. Specifically, aid in identifying and modeling "best practices" in adult learning is sought, as well as a wider focus on adult learning outside of higher education.

C. Demographic Trends

In the United States there are three noticeable demographic trends that will increase the demand for education: (1) the aging of the population, (2) immigration, and (3) the proportion of minorities in the population. The median age in the United States has risen from 16 in 1820 to 35 in 1998 (Bills 1998; U.S. Bureau of the Census 1998, Internet data), and it continues to rise. Higher education enrollment of those ages 25 and older also is expected to increase. By 2008, the projected enrollment of adults (ages 25 and older) in institutions of higher education is expected to increase by 20 percent from what it was in 1988 (Gerald and Hussar 1998, middle range projection, table 6, p. 29).

Not only will the number of adults seeking higher education increase, but adults have different priorities than younger people who have just graduated from high school. The present educational system is only marginally geared towards serving adults with work, family, and community responsibilities. Institutional adaptations will need to be focused around accommodating adult time schedules and educational needs. Universities may need to consider becoming adult education institutions with an expansion of nondegree programs, reduced residency requirements, and competency-based assessment systems. Traditional higher education, with its stress on the transmission of received knowledge, may need to shift its emphasis on the process of learning and expansion of applied course offerings (Lehmann and Maehl 1995).

The foreign-born[1] population is a substantial portion of the U.S. population. The proportion that is foreign-born has steadily increased since 1970. In 1996, 9.3 percent of the U.S. population were foreign-born, almost 1 in 10 residents. More than one-fourth of the foreign born were from Mexico, and over 40 percent of all foreign-born were Hispanic (of any race). Although the foreign-born population were just as likely as natives to have a college degree, they also were less likely to have graduated from high school (16 percent vs. 35.6 percent) (U.S. Bureau of the Census 1998, 52–53). These demographic changes point to the continuing need for adult basic education and English-as-a-second-language (ESL) programs.

Trends in higher education are related to trends in the population. The key trends are that the adult segment is the fastest growing segment within higher education and that the demand for education remains strong. The proportion of students ages 25 years and older has risen from 28 percent of total enrollments in 1970 to 43 percent in 1995 (U.S. Department of Education, Digest of Education Statistics, 1997, table 174). In raw numbers this amounts to an increase from 2.4 million older students to over 6 million older students in 25 years—a 160-percent increase. It is also the case that women have made up increasing proportions of the enrollees and of those attaining higher education degrees.

With the aging of the student population and the increasing cost of full-time enrollment, part-time enrollment has increased dramatically. The number of part-timers has grown from 2.8 million in 1970 to 6.1 million in 1995[2] (U.S. Department of Education, Digest of Education Statistics, 1997, table 174). From data reported by NCES, part-time students were more likely to be enrolled in 2-year public schools, not be enrolled in degree programs, be independent students with dependents, be ages 24 years or older, be married, have parents that did not attend higher education, and work full-time (35 or more hours) (Horn and Berktold 1998, table 2.5a, p. 59).

Table 2 below displays the percent of the population in selected age groups who are in school (all kinds of institutions) by race/ethnicity. Compared with the total population, minorities are consistently underrepresented in the proportion of the population enrolled in school, with some interesting exceptions. In 1975, 1980, and 1996, blacks who were in the 30-to-34-year-old range were more likely to be enrolled in school than whites of the same age, suggesting that blacks were more likely to return to school when they were older than were whites.

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[1] Natives are those born in the United States, Puerto Rico, or an outlying area of the United States; and those born in a foreign country who had at least one parent who was a U.S. citizen. All other people are foreign born. Although composed primarily of legally admitted immigrants, the foreign-born population also includes refugees, temporary residents, and some undocumented immigrants.

[2] Actually the number of part-time students in higher education has decreased in recent years from a high of 6.2 million in 1991, but the 1995 proportion of part-time students is the same in 1995—43 percent.

Table 2—Percentage of the U.S. population 22- to 34-years-old enrolled in school by race/ethnicity: Selected years

	All races	White, non-Hispanic	Black, non-Hispanic	Hispanic origin
1975				
22–24 years	16.2	16.4	13.9	14.1
25–29 years	10.1	10.1	9.4	8.3
30–34 years	6.6	6.6	7.1	5.5
1980				
22–24 years	16.3	16.8	13.6	11.7
25–29 years	9.3	9.4	8.8	6.9
30–34 years	6.4	6.4	6.9	5.1
1985				
22–24 years	16.9	17.5	13.8	11.6
25–29 years	9.2	9.6	7.4	6.6
30–34 years	6.1	6.2	5.2	5.7
1990				
22–24 years	21.0	21.9	19.7	9.9
25–29 years	9.7	10.4	6.1	6.3
30–34 years	5.8	6.2	4.5	3.6
1996				
22–24 years	24.8	25.9	21.2	17.6
25–29 years	11.9	11.8	13.7	8.6
30–34 years	6.1	5.8	7.0	5.0

Source: Snyder, Hoffman, and Geddes 1997, table 7.

Changes in composition of the population are more accelerated in some parts of the United States. Recent population growth is fastest in the western and southern regions of the country. This includes the states of Idaho, Nevada, Utah, Colorado, Arizona, and Georgia, which experienced 2.0 to 4.5 percent growth from 1995 to 1996. The states of Texas, California, Florida, Georgia, Arizona, and North Carolina increased their populations by at least 100,000 people. Certain states (California, New York, and New Jersey, and the District of Columbia) consistently experience high rates of international in-migration while simultaneously experiencing high rates of net out-migration to other states. California had the highest amount of international immigration each year of the 1990s decade, followed by New York, Texas, Florida, Illinois, New Jersey, Massachusetts, and Virginia, as well as the District of Columbia.

1. Policy Implications of Demographic Changes

The substantial state and regional variations in population trends have major implications for lifelong learning issues in the United States. Indeed, there have been major population shifts away from the Midwest and mid-Atlantic states and toward the South and West as a reaction to decreases in economic opportunity and quality of life (Lehmann and Maehl 1995; Bills 1998). Movement across state boundaries also raises issues of state residency, accreditation, and standardized achievement measures for workers.

One of the key issues that arises out of demographic trends is that of access. In higher education, the participation of minority students has increased, although the enrollment rates of some minority groups remains lower than for white students. In 1976, African-American enrollment was 9.6 percent of all higher education; it was 10.7 percent in 1995. Hispanic enrollment has increased from 3.6 to 7.9 percent from 1976 to 1996 (Snyder, Hoffman, and Geddes 1997, table 207). A key question is whether lifelong learning with a more open approach can reach out to minority students and reverse the underrepresentation of these groups.

The issue of access is not unrelated to the issue of cost. Two methods of resolving the problem of increasing costs of higher education have emerged. The first is a high-cost, high-aid approach that will, in effect, shift costs to those who can afford them. The second is a low-cost, high-state-aid approach that is likely to gain support from the middle class that already pays for education through high taxes. In a high-cost, high-aid scenario, it is the middle class who gets squeezed by paying both taxes and high tuition. This question of how to ensure access in the face of rising costs has major consequences for access and enrollments (Lehmann and Maehl 1995).

As stated above, higher education has fallen in the priority assigned to it by the states. While state spending on higher education increased by 25 percent between 1980 and 1992, it is worth noting that higher education spending as a proportion of state revenue has fallen from 11.3 percent to 9.2 percent. The fact that higher education spending decreased as a proportion of state spending indicates the lower priority placed on higher education versus other programs. Lower priority status and slow economic growth, combined with increases in enrollments, resulted in making education less affordable for the adult learner and student aid more difficult to obtain. In addition, federal spending on higher education has decreased by 22 percent between 1980 and 1992 (Lehmann and Maehl 1995). These trends, which may be partially reversed by better economic circumstance in the late 1990s, should alert policymakers to the issue of access and affordability for all adult learners, whether in higher education, work-related training, or basic education.

II. How Adults Learn

It is one thing to comprehend the current status of adult education in the United States and where improvements are needed, but it is quite another issue to understand how adults learn and how the state of adult education and skills can be improved. Understanding the nature, context, and processes of adult learning is a crucial ingredient for making effective program and policy decisions to improve workforce skills (Merriam and Caffarella 1998).

Many researchers have attempted to explain the processes and elements involved in learning among adults. However, just as there exists no single theory for learning in general, there is no one model to explain how adults learn. Rather, various researchers have set forth several frameworks and models to explain how adults learn and how their learning differs from that of children. Researchers propose that learning among adults can be differentiated from learning in childhood with respect to the learner, the context, learning process, and the interaction of these three variables. Some highlights from the literature in this field follow and are based on a review by Merriam and Caffarella (1998).

The primary model for adult learning for almost 30 years has been the concept of *andragogy*, set forth by Malcolm Knowles. Andragogy, described as "the art and science of helping adults learn," is contrasted with *pedagogy*, "the art and science of helping children learn" (Merriam and Caffarella 1998, 272). In this sense, Knowles' framework concentrates particularly on the adult learner and his or her life situation. The five key assumptions about androgogy are as follows:

- Adult learners are independent.
- Adult learners draw from their life experience.
- Adult learners have various degrees of readiness to learn that may depend on social roles.
- Adult learners desire immediate application of what they learn.
- There are important internal factors related to motivation to learn. Adult learners are not driven solely by external factors related to the provider, work context, etc.

Knowles' theory became a vehicle for researchers who were attempting to define the adult education field, but there is much contention about whether the principles of androgogy could indeed be termed a "theory" or whether they simply constituted good practice. Although the actual process of learning may or may not be different between adults and children, there are enormous differences in motivation, structures of time, context, and life experience. Adult education can be seen as transformative rather than additive in nature (Merriam and Caffarella 1999).

As a learner, an adult has accumulated more and different types of experiences than children. These richer experiences may positively or negatively affect an adult's ability to learn; the experiences may provide important resources, but it may also be difficult to change certain established attitudes and ways of life. Throughout these life experiences, adults continue along the course of psychological development, dealing with different issues than do children. While children spend most of their time preparing for adult roles, adults must function in their present roles. Adjustments for these transitions and other accompanying life events frequently occur through learning, perhaps causing adults to seek out learning or resulting in new learning (Merriam and Caffarella 1998).

The context of learning also differs between adults and children. While children are, for the most part, full-time students and learners, adults are learners on top of other full-time roles. Adults most often will apply this learning immediately to their lives, as opposed to children who are preparing for their future. When adults choose to add this role to their lives, they are constrained by work, family, and school; in contrast, children's boundaries are typically home and school (Merriam and Caffarella 1998).

Although adult learners differ significantly from children with regard to the context of learning, fewer differences exist in the learning process itself. The actual process of learning is likely to be quite similar for both children and adults, but more attention is given to the transformation of experience for adults rather than the accumulation of knowledge. Within this process, two factors that affect adult learning in particular are speed and meaningfulness: (1) the time an individual has to examine and respond to a situation slows with age, and limits from time constraints in life may negatively affect learning; (2) adults are typically unlikely to participate in learning unless it is meaningful to their lives. Issues related to these factors are the increased likelihood of health problems and the decreased rate at which the working memory processes information in older individuals (Merriam and Caffarella 1998).

Given these differences, researchers have suggested conditions under which adults will learn optimally. A summary report on adult instruction (Kirshstein 1996) highlights the following factors that constitute an optimal adult learning experience:

- mutual respect between students and instructors;
- integration of the previous knowledge and experience of the students;
- input from students when choosing class materials and structure;

- interaction among students as well as discussion between the teacher and the student;
- ability of instructors to lead and assist adults in learning; and
- a learning environment in the context of other life tasks and demands.

Adult education classes that take advantage of these factors will typically be the most successful in teaching adults (Kirshstein 1996, 32).

III. Types of Programs

This section discusses the various ways in which types of adult education programs have been conceptualized, including frameworks of both narrow and broad scope. Regardless of the scope of their frameworks, researchers have organized program types by several criteria; some have grouped types according to reasons for participation, while others have also discussed distinct programs according to federal legislation. Still another way to conceptualize program types is by the institutions that provide them. Table 3 below provides a guide to linking all the various frameworks discussed in this paper. Rows show how work-related education, adult basic education, and personal/recreational education are grouped by the different organizational schemes. Columns represent the description of ways that programs have been categorized.

Table 3—Categorizations of lifelong learning

Broad categories	**Levels and purposes of adult education (NHES: Adult Education Survey)**	**Work-related postsecondary training (Hansen 1994)**	**Broad principles of adult learning (Pelavin/OERI Review; Kirshstein 1996)**	**Levels of adult learning (Airly House Report)**
Work-related learning/training	Apprenticeship	Qualifying training	Job training and re-professionalization	
	Work-related training	Retraining		Occupational retraining
		On-the-job training		Technological and managerial expertise
	Credential programs			
		Second chance training (e.g., JTPA)		
Adult basic education	Adult basic education/GED		Adult literacy	Adult literacy
				High school equivalency
	English as a Second Language (ESL)			English language fluency
Personal/ recreational learning	Other (personal use)		Personal enrichment	

Sources: Kopka, Schantz, and Korb 1998; Hansen 1994; Kirshstein 1996; and U.S. Department of Education 1998.

A. Levels and Purposes of Adult Education

Taking a broad approach to the range of activities included in "adult education," the 1995 National Household Education Survey (NHES) conducted by the National Center for Education Statistics ((NCES) U.S. Department of Education) outlined six types of adult education programs, as follows: (1) English as a second language; (2) adult basic education and literacy, (3) credential programs, (4) apprenticeship programs, (5) work-related courses, and (6) personal development courses.

English-as-a-second-language (ESL) instruction helps those for whom English is a second language improve English skills. Adults who are already proficient in English but lack basic academic skills may participate in adult basic education (ABE); literacy and basic skills courses; General Educational Development (GED) preparation classes; and adult high school programs to improve basic reading, writing, and math skills or to earn a high school diploma or its equivalent.

Adults who have mastered basic skills and have attained a high school diploma may enroll in a third type of program—a credential program—that leads to a college or university degree, a postsecondary vocational or technical diploma, or another certificate related to qualifications for jobs or licenses.[1] Apprenticeship programs prepare adults more specifically than credential programs by providing training in occupations through a mixture of on-the-job training and formal education. Adults who do not need initial job training but wish to improve in a job or career field (whether or not they currently hold a job) may participate in work-related courses; examples include courses taken at work, courses taken elsewhere that relate to a job, or courses for a license or certification for a job. Coursework unrelated to work or any of the above categories are characterized as personal development classes and include various educational activities related to health, hobbies, sports, computers and other technology (other than work-related), and religion (Kim et al. 1995).

B. Work-Related Postsecondary Training

While NHES reports have organized their discussions of "types of adult education" around broad types of programs in which adults may participate, Hansen (1994) limits her discussion to work-related postsecondary training. Her focus is comparable to an expansion of NHES' "work-related" category, mixed with some ESL and ABE. Four types of "work-related post-high-school training that modern economies usually believe it necessary to provide" are outlined by Hansen (1994, 2). These include the following: (1) qualifying training (which may include secondary training as well as postsecondary training) initially prepares people for work; (2) skills improvement training helps already employed individuals further their education and upgrade skills to increase their job mobility; (3) retraining is for individuals who want to prepare for an entirely new line of work because they are about to be displaced from a current job; and (4) second-chance training provides a combination of basic education and job skills, perhaps combined with other social services, to individuals who are seeking to reach economic self-sufficiency through employment (Hansen 1994).

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[1] NHES 1995 includes part-time, but not full-time, participants in credential programs in its definition of adult education.

C. Broad Principles of Adult Learning

A third framework for thinking about types of adult education programs, presented as broad principles in a paper prepared by Pelavin Research Center, combines the NHES and Hansen conceptual frameworks. The Pelavin paper has organized various types of programs into three major categories: adult literacy education, job training/reprofessionalization, and personal enrichment. The program types are grouped as follows (Kirshstein 1996, exhibit 1, p. 7):

Table 4—Broad principles of lifelong learning

Categories of lifelong learning	Types of programs
Adult literacy education	Adult basic education (ABE) English as a second language (ESL) GED/High school completion Family literacy Workplace literacy Citizenship
Job training/reprofessionalization	Licensing Accreditation On-the-job training Workplace skills Vocational training JPTA JOBS Postsecondary degree programs Continuing education
Personal enrichment	Travel Cultural enhancement Continuing education

D. Levels of Adult Learning

A fourth way of categorizing adult learning was outlined in a report developed by an NCES team that became known as the "Airly House Report" for the location of the meeting (in Virginia) (U.S. Department of Education 1998). It was initiated as a policy background paper in preparation for a new impetus to collect information about adult learning since data collection systems were already in place for early childhood education, elementary and secondary education, and postsecondary and graduate/professional school education. To round out the focus to include a whole lifespan, the participants argued, information is needed about the rest of life—namely the majority of our years—the adult years, when education is not the primary focus. As they noted, adults may participate in every facet of learning, from the basics of literacy to advanced degrees. The paper divided the types of education and training into the following categories: (1) adult literacy; (2) high school equivalency (e.g., programs in adult secondary education (ASE)); (3) English language fluency; (4) occupational retraining; and (5) technological and managerial expertise. The report outlines the benefits to participants and the wider community of taking advantage of adult learning experiences. Persons, especially parents, who take advantage of literacy programs benefit when they are able to become more involved in their children's education. Employment and other education opportunities are enhanced as a result of obtaining a high school diploma or its equivalent. For many immigrants to the United States, learning to speak, read, and write English is a critical step to economic independence and necessary to becoming an active American citizen. As local economies experience transitions, dislocated workers discover the benefits of learning new skills and thereby gain access to new careers.

Specific training also is often rewarded by employers and may be offered by the employer, including one of the largest providers and consumers of adult learning—the U.S. military.

E. Providers of Learning Activities

Despite the different scopes of the four frameworks, the four reports discussed above (Hansen 1994; Kirshstein 1996; Kim et al. 1995; U.S. Department of Education 1998) all examine the institutions that provide adult education. This breakdown of adult education programs by providers constitutes yet another way in which to conceptualize "types of programs."

As defined by NHES, providers are "schools, organizations, businesses, or individuals that provide instruction," specifically elementary/secondary schools, 2-year junior/technical colleges, 4-year colleges/universities, vocational/trade schools, business/industry, government, and others. For the purpose of this report, a provider of a learning activity is the entity that organizes the activity, not necessarily the party that pays for it. However, instructional provision is only one aspect of educational provision. Providers may be defined by location of courses, provision of instruction, provision of the curriculum, and/or funding of the educational activity. For example, a course may be offered at a local community college that is designed to equip participants with occupational skills that are needed at a local firm. The firm could have provided the curriculum and the instructor, in addition to paying for its employees to take the course. This is essentially what is referred to as "customized training"—learning that is specified by a business, even if it is located at a community college. In this case, according to the NHES definition, the provider is the community college because it is the organizational entity that is overseeing the instruction. The literature is fairly confusing on these points, and there are other complications as well, such as the perception of the participants and government support of programs to fill business skill needs. Survey respondents may not know how to answer questions related to provision of the learning activity; they simply know where they attended the activity (location). They may or may not know who paid for the course and if there were additional costs that were subsidized by a local company or government.

Among the categories of providers listed above, 4- or 2-year colleges or universities and businesses provided the majority of adult learning activities (30.6 percent and 27.1 percent, respectively) (Kopka, Schantz, and Korb 1998). Local governments provided an additional 11 percent, while other groups or organizations each provided less than 10 percent of all adult learning activities. Although the providers of adult education identified by NHES are reflected in Hansen's discussion (Hansen 1994), she limits the report to work-related postsecondary training. The text in the next section provides a summary of Hansen's elaboration of seven categories of providers or sponsors of work-related postsecondary training. Table 5 is taken from the Pelavin report; it summarizes providers of lifelong learning activities, including those described by both NHES and Hansen (Kirshstein 1996, 7).

Table 5.—Providers of lifelong learning activities

Fully or partially tax-supported agencies and institutions	Nonprofit self-supporting agencies and institutions	For-profit providers	Nonorganized learning opportunities
• Schools, colleges, and universities • Armed forces • Museums • Libraries	• Religious institutions • Community agencies/volunteer agencies • Professional organizations • Unions	• Correspondence and proprietary schools • Training institutes • Computer software manufacturers • Book publishers • Employers	• Television • Computers/ technology • Self-directed learning

Source: Kirshstein 1996, 7.

- Community and technical colleges are unique in higher education for several reasons: they have relatively few admission requirements (some have "open-door" admissions); they are comparatively inexpensive; most students enroll on a part-time basis; and state and local governments do not typically restrict or cap enrollment. For this last reason, enrollments at community colleges tend to reflect student demand. Services offered not only reflect local decisionmaking but also state planning and rationalization of service areas. Community colleges are increasingly working with businesses to provide customized or contract training programs for the specific needs of firms. Because of the various demands for services, the colleges cover a range of training needs. Services include remediation, ESL, retraining for displaced workers, training for hard-to-employ individuals, assistance to local economic development initiatives, and recreation and community service activities. As "service conglomerates," community colleges offer both credit programs for associate degrees and shorter certificate courses. Some also have an important role in providing education and training through federal retraining and second chance programs.

  At the top of the hierarchy for vocational programs, community colleges have experienced the most growth among institutions of higher education. From 1970 to 1995, 2-year public institutions more than doubled their fall enrollments from 2.2 million in 1970 to almost 5.3 million in 1995. In 1995, about 37 percent of all undergraduate enrollments in 2- and 4-year colleges and universities were in public 2-year schools (Gerald and Hussar 1998, table 178). For the most recent years that data are available, however, this sector has experienced a decline in enrollment, as the number of students enrolling in any type of higher education institution also has declined since 1992. Despite the large number of students enrolled, most community colleges are relatively small; in the fall of 1990, 13 percent had less than 1,000 students enrolled, and 67 percent had less than 5,000 students enrolled. Tuition from these students accounts for only 18 percent of revenues generated by community colleges, while approximately 67 percent comes from state and local governments and 5 percent is from the federal government.

- Proprietary vocational schools are for-profit educational institutions that have historically operated outside of and largely invisible to the traditional collegiate world and public oversight bodies. They offer highly structured, primarily short-term occupational programs in a single subject or a few related subjects—such as secretarial and clerical training, computer programming, certain trades, truck driving, and cosmetology—that diverge very little from the skills specifically needed for the particular occupation. Although most of these programs last less than a year, some schools offer associate and baccalaureate degrees.

While they offer a range of training for specific occupations, proprietary schools are less likely than community colleges to work with businesses on customized training. Other programs in which proprietary schools do not typically engage include federal second chance programs such as JPTA and JOBS. However, some obtain contracts to serve JPTA and JOBS clients, most often when lower-priced services are unavailable through community colleges or other local training organizations.

Although the above general information is known, specific enrollment and revenue statistics are seldom available for proprietary vocational schools. Estimates of these statistics by NCES indicate that approximately 722,000 students were enrolled in 4,700 proprietary schools in the fall of 1989. Across all the schools, the median fall enrollment in 1988 was 64, although some very large programs had enrolled more than 10,000 students. Among these students were disproportionate numbers of women, minorities, and low-income individuals. Approximately 80 percent of all the students enrolled at propriety schools half-time or more in 1989–90 received grants or loans from federal student aid programs, compared to about one-fifth of students at community colleges. This demonstrates that the federal government plays an important role, despite the lack of direct government subsidies.

- The presence or absence of area vocational school and adult education schools depends largely on individual state policies. While these schools are not found everywhere, programs similar to those they offer are provided in some communities by vocation-oriented adult schools that are part of the public school system. Services include remedial education, preparation for GED exams, ESL instruction, avocational and hobby courses, and vocational courses. Vocational courses include business, marketing, real estate, secretarial, automotive mechanics, air conditioning maintenance and repair, and other trades.

- Responsive to specific, geographically, or ethnically based constituencies, community-based organizations (CBOs) are private, nonprofit organizations representative of a community that provide education, training, employment, and social services to that community. The range of specific services they provide includes job development and counseling, job search and placement assistance, classroom skills training, remedial education, vocational exploration, prevocational training, and ESL. While they offer a variety of services, CBOs are particularly adept at recruitment, counseling, and job placement. Although services that help clients obtain jobs are more prevalent than are education and training activities among CBOs, these organizations account for 20 percent of classroom training providers for JPTA. In the areas of training and employment, they are still almost entirely dependent on government programs for funding.

- A comparatively minor source of training in the United States, apprenticeships are defined by the Government Accounting Office (GAO) as "structured, long-term (typically 3 to 4 years), on-the-job training combined with related theoretical instruction, leading to certification of the attainment of journey worker status in a skilled trade." In their training, apprentices work closely with a particular employer who pays wages and provides training costs. Funds for employers often come from local and national trust funds established jointly by unions and employer associations. Because of this funding source, apprenticeships are concentrated in a few heavily unionized industries and train a small proportion of the overall workforce. (For more discussion on apprenticeships, see section III, Types of Adult Education.)

- Employer-sponsored training includes learning activities that employers organize and are considered part of the company's ongoing work. (Not included in this category are instances of learning opportunities that an employer subsidizes or pays for through a tuition benefit.) Because employer-sponsored training is a decentralized and largely private operation, reliable estimates of costs and participation are difficult to obtain. Estimates, however, indicate that the costs of formal, employer-provided training totals $30 to $45 billion annually, while formal and informal on-the-job training costs amount to $105 to $210 billion annually (OTA 1990, 128–30, from Hansen 1994, 40). Although these cost figures are not highly reliable, Bureau of Labor Statistics surveys have more accurately reported on participation in employer-sponsored training. In 1991, 16 percent of workers cited participation in skills improvement training through formal company programs at some point in their current line of work (BLS 1992 in Hansen 1994, 40–41). Company personnel may provide instruction, or a company may pay for an outside vendor to meet training needs including equipment vendors; private training consultants; schools; professional, trade, and labor organizations; community organizations; and private tutors and instructors.

  Because employer-sponsored training is a largely private enterprise, federal support is insignificant and provided indirectly. There is, however, a tax benefit to companies who offer training. All types of training costs may be deducted from company revenue in calculating tax liability. States are more likely to provide direct aid through customized training provided at public community and technical colleges at the request of firms (Hansen 1994, 41).

- The military is an important and unique source of training in the United States. Making important contributions to middle-level training, the military devotes more than half of its training to "specialized skill training": practical and hands-on job training for mainly enlisted persons. Among training providers, the military is unique because extensive training is provided to all new recruits and is not focused on management-level workers. Some of the services are provided directly by the military while civilian contractors supply others. Because they continually evaluate and update their training—via job analyses to establish performance standards, continual feedback, and rotations of instructors into the field—the military is an important source of innovation in training. In fiscal 1992, the military expected to spend more than $19 billion on training—a sum that calculated per person is considerably more than private industry ($3,500 per person vs. a few hundred per employee) (Hansen 1994, 42–43)

A major category that Hansen does not include in her seven categories of adult education is 4-year institutions. According to NCES, in 1995, there were more than 3.3 million people ages 25 and older who were enrolled in a 4-year institution of higher education. Adults in this age group constitute 38 percent of all those enrolled in either public or private 4-year institutions. This age group also comprises almost three-quarters (73.6 percent) of all part-time and about one-fifth of full-time (23.4 percent) students. In addition, graduate and first-professional degree institutions enroll a substantial number of adults ages 30 and older. More than half of all graduate students (52.4 percent) and about one-fifth (23.7 percent) of first-professional degree students are 30 or older. Overall, a high proportion of students in all levels of higher education are adults ages 25 and older. In 1995, a full two-fifths (44.3 percent) of all higher education students were 25 or older (Gerald and Hussar 1998, table 176).

IV. Participation Rates, Reasons for Participation, and Characteristics of Participants

According to NHES, which assessed the number of adults[1] that participated in adult education courses over a 12-month period by selected demographic and labor force characteristics, the overall participation rate in adult education increased from 32 percent in 1991 to 40 percent in 1995 (Kopka, Schantz, and Korb 1998). This substantial group of adult learners is diverse; individuals vary widely in terms of age, abilities, job experience, personal experience, cultural background, personal goals, personal identities, and educational backgrounds (Kirshstein 1996).

While the objective of this section is to discuss various types of participants and their reasons for participating, it also has been argued that adult learners have a great deal in common. In general, adults voluntarily participate in educational activities, believing that their return to classes/school is important and will prove beneficial. Intending to use the educational experiences to help them solve daily problems and improve performance in various social roles, adult learners are typically pragmatic learners. Because of the practical nature of their learning, these adults will usually let schooling take second place to other responsibilities and expect time in class to be well spent. Despite their willingness to improve their daily lives, in some learning environments adult learners may be insecure or embarrassed about returning to school with younger students and may have negative impressions of their own abilities, teachers, schools, and other educational settings (Kirshstein 1996).

While NHES reports have not indicated significant differences among participants in adult education activities with respect to sex and race/ethnicity, they have identified relationships between participation and age, occupational status, and educational attainment. There also are relationships between individual characteristics and reasons for engaging in learning activities. Adults participate in learning activities for a variety of reasons including job advancement, skill enhancement for a current job, to learn English, or for social or personal reasons. Relevant to an analysis of participation is both the identification of reasons and also an examination of participation rates among various subgroups of adult learners.

Reports from NHES 1995 and NHES 1991 have identified the main reasons for participation in adult learning. However, it is difficult to compare overall rates of participation between 1991 and 1995 because the format for data collection changed between the surveys. (See attachment B.) In 1991 respondents were asked to list courses they had taken, while in 1995 respondents were asked about courses they had taken within each of six general categories. To date, no comprehensive paper of results with comparable data between the two studies has been published. For this report, the 1991 survey results will be used primarily; 1995 data will be used when the questionnaire designs are comparable. In the 1991 survey, respondents were asked about their main reason to take a course. They could choose from the following reasons:

- a personal, family, or social reason;
- to improve, advance, or keep up-to-date on your current job;
- to train for a new job or a new career;
- to improve your basic reading, writing, or math skills;

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[1] Adults are defined as noninstitutionalized civilians, 17 years or older, who were not enrolled full-time in elementary or secondary school at the time of the survey.

- to meet a requirement for a diploma, degree, or certificate of completion; or
- did you have some other main reason (specify)?

Table 6—Participation rates in adult education and main reason for participation, by sex, parental status, race/ethnicity, and educational attainment: 1991

Characteristic	Total[1]	Improve/ advance in job	Train for new job	Personal/ family/ social	Improve basic skills	For diploma/ degree	Other	Unknown[2]
Total	31.6	18.8	3.0	9.5	0.4	4.1	0.3	0.8
Age								
17–19 years	27.7	5.6	7.2	10.7	2.5	9.3	0.2	0.5
20–24 years	34.8	15.3	5.2	9.4	0.6	9.4	0.4	1.0
25–29 years	38.2	23.5	4.6	9.6	0.6	6.6	0.2	1.1
30–34 years	36.1	23.5	4.0	9.3	0.4	4.1	0.2	0.7
35–39 years	41.1	27.1	4.2	10.2	0.2	5.7	0.4	1.0
40–44 years	48.1	32.3	2.8	13.6	0.5	4.7	0.2	1.9
45–49 years	39.1	28.3	1.8	10.9	0.3	3.4	0.3	0.7
50–54 years	26.2	17.6	1.7	8.1	0.1	1.4	0.4	0.4
55–59 years	28.5	18.9	1.7	8.5	0.2	1.5	0.3	0.5
60–64 years	17.2	9.0	0.4	7.4	Low n[3]	0.8	Low n	0.6
65 and older	10.5	2.3	0.4	7.6	Low n	0.3	0.1	0.3
Sex								
Male	31.6	21.1	2.6	7.6	0.4	3.6	0.3	0.6
With children under age 16	36.7	27.6	3.2	6.6	0.4	3.3	0.2	0.6
No children under age 16	28.5	17.3	2.3	8.3	0.4	3.7	0.3	0.6
Female	31.6	17.0	3.3	11.0	0.4	4.6	0.2	1.0
With children under age 16	36.9	20.7	4.4	12.0	0.3	5.0	0.2	1.1
No children under age 16	28.2	14.7	2.5	10.4	0.4	4.3	0.3	0.9
Race/ethnicity								
White, non-Hispanic	33.1	20.4	2.8	9.9	0.2	4.3	0.3	0.8
Black, non-Hispanic	22.8	12.1	3.2	6.8	0.7	3.0	0.2	0.9
Hispanic	29.2	14.1	4.8	8.9	1.2	3.5	0.3	0.8
Educational attainment								
High school or less	19.3	9.9	2.5	6.1	0.5	2.0	0.1	0.4
Some postsecondary school	44.9	28.6	3.5	13.2	0.3	6.4	0.4	1.2

[1] Participants may be counted in more than one reason.

[2] This column represents participants who refused, did not know, or were not able to give a reason.

[3] Too few sample observations for a reliable estimate.

SOURCE: U.S. Department of Education, 1993.

In 1991, almost one-third of the adult population participated in some kind of learning activity (table 6) (Kim, Collins, and McArthur 1997; Kopka, Schantz, and Korb 1998). The primary reason for participation in adult learning was to improve or advance in a current job or career (19 percent). Another 3 percent participated to train for a new job, making more than one-fifth of the whole population involved in some kind of job-related learning. Participation rates vary with demographic characteristics; however, the best predictors are educational attainment and age. Persons with more years of education tend to participate at a higher rate than those with a high school diploma or fewer years of education. Almost one-half (48.1 percent) of the adult population ages 40 to 44 participated in some kind of adult learning. The intersection of demographic characteristics and participation rates will be described in the next sections.

A. Participation Rates by Sex

Men and women participate in adult learning at the same rate—31.6 percent. Men and women also rank their primary reasons for participation in adult learning activities in the same order. However, there are differences in the proportion of men and women who cite various reasons for participation. While the number one reason among both men and women for participation in adult education was to improve or update work skills in their current job, a larger proportion of men cited this reason than did women (21 percent vs. 17 percent) (see Table 6). Conversely, a larger proportion of women than men cited personal, family, or social reasons and the intention to earn a diploma or a degree (4.6 vs. 3.6), even though these reasons ranked second and third, respectively, for participants of both sexes (Kim, Collins, and McArthur 1997).

For both women and men, the presence of children under age 16 is associated with higher rates of adult learning connected to improving or advancing in their current job, perhaps because these parents also are relatively young and, as described in the next section, younger adults tend to participate more often than older adults. More than one-quarter (27.6 percent) of men with children under age 16 enrolled in a course to improve or advance in their job, compared with 20.7 percent of the women with children under age 16.

B. Participation Rates by Age

Age clearly differentiates participants in adult education from nonparticipants (see table 5). Data from NHES 1991 show that participants tended to be younger than nonparticipants. Only 15 percent of the population ages 55 or older participated in adult education in 1991. Each of the younger age groups (17–24, 25–34, and 35–54 years) was more than twice as likely to participate as those ages 55 and older (Kopka, Schantz, and Korb 1998).

Age also is correlated with the type of adult education pursued. Although extensive analyses have not been done using NHES data to examine participant characteristics by each type of adult education experience, an analysis of ABE/GED and ESL participants has been done. Data from the most recent national study available, NHES 1995, show that participants in ABE/GED and ESL classes tended to be younger, rather than older, adults (see table 7). Persons in the age groups of 16 to 25 and 26 to 35 were more likely than were those over age 45 to participate in ESL classes. Less than 1 percent of this oldest group (55 or older) participated in any basic skills education. Although many adults over the age of 60 are included in the population of interest for basic skills education, the majority see little need to enroll in classes (Beder 1990).

Table 7—Percentage of adults ages 16 and older who participated in basic skills education[1] and English as a second language[2] (ESL) by age: 1994–95

Age of respondent	Percent participating in basic skills education	Percent participating in ESL education
16–24 years	23.1	18.6
25–39 years	9.1	13.2
40–54 years	5.4	10.1
55 years and older	.4	4.0

Source: Kim, Collins, and Stowe 1997; Kim, Collins, and McArthur 1997.

Regardless of their sex, younger adults are more likely than older adults to participate in adult education and reasons for participation also vary by age. Adults ages 17 to 19 participated in learning activities to train for a new job, to earn a diploma or a degree, or to improve basic skills significantly more often than did adults ages 55 or older.

Participation peaks among those ages 40 to 44; almost one-third (32.3 percent) engaged in adult learning. The mid-career years (for most people, ages 35 to 49) is the time when people are most likely to participate in adult learning to improve or advance in a current job. Adults aged 40 to 44 also were the age group most likely to take courses for personal, family, or social reasons (13.6 percent). Younger adults (under age 39) were more likely to take courses to train for a new job than older adults. Close to 10 percent of adults ages 17 to 24 enrolled in adult learning for credit, in order to complete a diploma or a degree. The youngest age group (ages 17 to 19) were also the most likely to enroll in a basic adult education class (see table 6).

C. Participation Rates by Race/Ethnicity

Age and sex not only differentiate participation in adult education; coursetaking also differs by race/ethnicity. One-third of whites (33.1 percent) participated in adult education, compared to 22.8 percent of blacks and 29.2 percent of Hispanics. Whites (20 percent) are significantly more likely than both blacks (12 percent) and Hispanics (14 percent) to participate in adult education to improve skills in the workplace. Whites also enroll in adult education more often than do blacks to earn a diploma or a degree (4.3 percent vs. 3.0 percent). Whites report lower levels of participation for the purposes of training for a new job or improving basic skills than Hispanics (2.8 percent vs. 4.8 percent and 0.2 percent vs. 1.2 percent, respectively) (Kopka, Schantz, and Korb 1998).

D. Participation Rates by Level of Education

As noted above, persons with more years of education are more likely to participate in adult learning. In fact, as table 8 indicates, the participation rate increases with educational attainment. Reports from NHES 1995 indicate that participation in adult education of any type increases with each level of education attained (less than a high school diploma; high school diploma or equivalent; some college, associate's degree, or vocational/technical diploma; and bachelor's degree or higher). More specifically, the participation rate of college graduates was over three times greater than the participation rate of adults who had not earned a high school diploma and almost twice the rate of high school graduates without any postsecondary training (Kim et al. 1995). Among those who had not graduated high school or earned a GED, individuals who had completed more grades of formal schooling were more likely to enroll in GED classes or other high school completion programs (Kim, Collins, and Stowe 1997). Adults who have completed more years of formal schooling not only participate in adult education activities more often, but also have enrolled more often in *multiple* types of adult education classes (Kim et al. 1995).

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[1] Includes civilian, noninstitutionalized adults, ages 16 or older, who were not enrolled in elementary or secondary school at the time of the interview and who met one of the following criteria: (1) did not have a high school diploma or its equivalent, (2) received a high school credential through GED testing in the last 12 months, or (3) was age 20 or older and received a high school diploma or its equivalent in the last 12 months.

[2] Includes civilian, noninstitutionalized adults, ages 16 or older, who were not enrolled in elementary or secondary school at the time of the interview and whose primary language at home was any language other than English.

These findings from NHES 1995, indicating that those with higher levels of educational attainment participate more often in adult education, support an increasing trend. The 1995 results showed that 52 percent of those with at least a bachelor's degree, 39 percent of those with some postsecondary education, 23 percent with a high school diploma or the equivalent, and 12 percent of those with less than a high school diploma participated in adult education. As illustrated by these data and from NHES 1991 data reported in table 6, those who are most in need of adult education (individuals who have completed fewer years of traditional, formal schooling) are increasingly the least likely to receive it.

Table 8—Percentage of adults ages 16 and 17 years or older who took part in adult education activities in a 12-month period by educational attainment, 1991 and 1995

Highest grade of education or year of school completed	Participation rate, 17 years and older, 1991	Participation rate, 16 years and older, 1995
Up to 11th grade	12	16
High school diploma or equivalent	23	31
Vocational/technical school	32	50
Some college	39	
Associate's degree	50	
Bachelor's degree	51	58
Postbaccalaureate School	55	

Source: Kopka, Schantz, and Korb 1998.

This relationship between educational attainment and participation, however, does not apply to ESL or ABE classes. Because ABE classes are designed specifically for individuals who are seeking to gain basic skills or a high school diploma, enrollments in them are highest for individuals who lack a high school diploma. In contrast, there is no significant relationship between years of education and participation in ESL classes, perhaps because people who have completed any number of years of formal education travel to the United States to learn English (Kim et al. 1995).

E. Participation Rates by Employment Status and Occupation

Reasons for participation in adult education activities differ not only with regard to personal background characteristics but also with respect to employment status, as indicated on table 9 from NHES 1991. While employed adults mainly participated to improve or advance in their current job (64 percent), those not in the labor force participated primarily for personal and social reasons (58.9 percent). Unemployed adults' principal reasons included the desire to complete requirements for a diploma or degree (35.1 percent), training for a new job or career (27.0 percent), and job improvement or advancement (19.0 percent) (Kopka, Schantz, and Korb 1998).

Overall, those in higher-level occupations participate at higher rates. Fifty-two percent of those employed in managerial and professional specialties participated in adult education; as did 35 percent of those in technical, sales, and administrative occupations; 23 percent of those in service occupations; 22 percent of workers in precision, production, craft, and repair work; and 19 percent of operators, fabricators, laborers, and farm and forest workers (Kopka, Schantz, and Korb 1998). Among adults who were employed, certain relationships between occupation and reasons for participation can be observed. While managerial and professional individuals were the most likely to participate to advance in a job, they were least likely to participate for personal or social reasons. Conversely, service workers were the least likely to participate to advance on the job, but they showed higher participation rates for earning a degree or a diploma than did workers in any other occupation.[1]

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[1] Note that significance levels were not reported in the source document.

Table 9—Participation rate and percent distribution of adult education coursetaking by occupation, employment, and main reason for participation: 1991

	Participation rate	Main reason for taking course						
		All reasons	Personal/ social	Advance on the job	Train for a job	Improve basic skills	Earn a degree/ diploma	Other
Occupation								
Managerial and professional specialty	52.2	100.00	16.7	65.3	3.7	0.2	14.1	0.1
Technical, sales, and administrative support	34.7	100.00	21.7	54.3	6.6	0.8	16.4	0.2
Service workers	23.0	100.00	20.1	46.1	9.3	1.3	22.8	0.3
Precision, production, craft, and repair	22.1	100.00	21.0	56.1	10.9	1.2	10.4	0.3
Operators, fabricators, laborers, and farm and forest workers	18.9	100.00	20.7	51.5	5.4	1.9	20.3	0.1
Labor Force Status								
Employed	40.8	100.00	15.0	64.0	5.2	0.5	15.2	0.1
Unemployed	21.4	100.00	16.1	19.0	27.0	1.5	35.1	0.1
Not in labor force	14.5	100.00	58.9	15.9	8.4	2.2	14.0	0.6

SOURCE: Kopka, Shcantz, and Korb 1998, tables 4.1 and 2.2

V. Barriers to Participation in Adult Education

Presumably, the thousands of persons who engage each year in adult learning activities made a decision to participate, assumed that they would benefit in some way from the experience, and believed the incentives to participate outweighed the disincentives. Likewise, it is assumed that those who do not take advantage of these learning opportunities could benefit from them—at least that is the view of the large majority of the adult education community. The bulk of the research around barriers to adult education centers on those most in need of basic skills, i.e., those without a high school diploma or equivalent and those in need of English-as-a-second-language instruction.

A comprehensive review of the research on barriers to adult education has been prepared for the NCES by Mathematica Policy Research, Inc. (U.S. Department of Education, 1998b). This review covers the conceptual frameworks and empirical evidence used to examine the issue of why adults do not participate in adult education. Theoretical frameworks from a variety of disciplines and fields of study are described in the Mathematica working paper. Empirical evidence from 19 studies of barriers to adult learning is summarized (see table 3-1). This literature review does not aim to reiterate the findings of Mathematica's review. Instead, the focus is on explaining why the issue of barriers to participation is important and on describing the key line of research that attempts to delineate the most important barriers to adult education participation and which subgroups of the population are most affected by any given set of barriers.

A major objective in researching barriers is to identify the factors that keep individuals who have the most to gain from enrolling in adult education. Adult basic (skills) education and English-as-a-second-language (ESL or ESOL—English for speakers of other languages) are the primary types of learning that will be discussed in this section, since persons in need of basic skills and English language skills have the most to gain from attendance. As noted in the previous section, they also are some of the least likely to participate.

Under the rubric of adult basic education are the following categories: basic reading, writing, and math skills in preparation for a high school diploma or equivalent. In the NHES surveys, the population of interest included persons ages 16 and older who did not have a GED, high school diploma, or its equivalent, and those who received a GED in the previous year; and persons ages 20 and older who received a high school diploma (or its equivalent) in the previous year. That is, the surveys focused on those who were without a high school diploma or GED for at least part of the year.

A. The Importance of Identifying Barriers

Why is the issue of deterrents or barriers to adult education important? It is known that only a minority of individuals eligible to participate in formal adult basic education avail themselves of the opportunity and that the persistence rate among those who participate is much less than program administrators would desire. For example, it is estimated that 23 percent of the population over age 16 (44.1 million individuals) were out of school and without a high school diploma. In 1990–91, 3.7 million persons or about 8.4 percent of those eligible were enrolled in federally funded literacy or basic education courses (Wikelund, Reder, and Hart-Landsberg 1992). The NHES 1995 found that the majority (94.1 percent or 29 million adults) of adults in the eligible population did not take part in ASE learning opportunities. About 16 percent reported that they were interested in participating, and only about 35 percent of those interested (4 percent of the eligible population) knew of classes or programs they could take to improve basic skills. In that group, the primary reasons given for nonparticipation were time (42.4 percent) and money/cost (20.3 percent).

Those considered to be "in need" of ESL are adults ages 16 or older who are not enrolled in elementary or secondary school and whose primary language at home was any language other than English. In NHES 1995, respondents were asked about their abilities to read and write English, their country of origin, their first language, and language spoken at home. The survey found that 12 million persons reported usually speaking a language other than English at home. Of those 12 million, 1.3 million or 10.8 percent reported taking an ESL class in the previous year. Over one-third (37.4 percent) reported that they read English "very well" or "well." About one-quarter expressed some interest in taking ESL and another 27 percent of nonnative-English speakers reported that they could not read English well and did not express interest in ESL courses.

Given the large number of potentially eligible participants in BSE or ESL, two questions arise immediately. What factors deter individuals from participating? And, how can program administrators and policymakers reach eligible nonparticipants?

B. Theories of Non Participation

There are many theories of participatory behavior grounded in the disciplines of economics, sociology, political science, and social psychology. Economic theories, which generally flow out of the rational choice or human capital models, give insight into how individuals might weigh the costs and benefits of participating in adult education or lifelong learning more generally. Social psychological theories alert policymakers to the influence of the individual's environment, peer influences, and predisposition. Political and sociological theories account for the institutional factors that make participation more or less available. According to the Mathematica paper, barriers may be categorized into (1) *situational constraints*, relating to a person's life situation; (2) *institutional barriers*, pertaining to policies and practices controlled by the provider of the learning experience; and (3) *dispositional barriers*, relating to individual attitudes and perceptions. After examining the research on barriers, the Mathematica paper reported four consistently identified barriers:

- the (lack of) time people have available to pursue adult education (situational);
- family responsibilities (situational);
- the time and place the courses are scheduled (institutional); and
- the cost of courses (institutional) (Silva, Cahalan, and Lacireno-Paquet 1998, 97)

Early theoretical work on participation in adult education strongly emphasized the factors that dispose individuals to participate in adult education or organized learning. The identification of types of learners, motives, and motivational orientations dominated this phase of research. Motivations to participate have been found to include self-improvement, family responsibilities, diversion, literacy development, community/church involvement, job advancement, launching, economic need, educational advancement, and the urging of others (Beder and Valentine 1987). Quantitative research studies have made it clear that classifying learners and their motivation orientations does not help to predict participation in adult education (Scanlan and Darkenwald 1984). In their influential paper, Scanlan and Darkenwald (1984) suggested that attention should be shifted to from what motivates people to participate to the factors that deter individuals from participating in adult education. In order to examine the factors that deter individuals from participation, they undertook a factor analytic study that serves as a model for research in the area of barriers to participation (see next section).

Adults lead complex lives. Both barriers and incentives usually exist (often simultaneously), whether or not individuals engage in learning. Generally, when adults do enroll in some kind of adult learning, incentives can be said to outweigh barriers. Much of the research since the 1984 paper of Scanlan and Darkenwald has focused on barriers. An approach that takes into account both barriers and incentives still remains to be developed.

C. Empirical Evidence of Barriers

Studies of barriers to participation have generally taken two approaches: (1) listing potential barriers to participation and ranking them according to mean item scores or frequency of agreement by the population; or (2) extrapolating underlying reasons for nonparticipation through factor analytic techniques. In a series of works throughout the 1980s and 1990s, Darkenwald and colleagues employed factor analytic techniques to arrive at an understanding of the reasons individuals do not participate in adult education. Scanlan and Darkenwald developed the Deterrents to Participation Scale (DPS) to study barriers to participation in continuing education among health professionals (a study that has limitations because a representative group was not surveyed). The DPS has been refined over time and versions of the scale that apply to all potential adult learners have been developed (Darkenwald and Valentine 1985; Valentine and Darkenwald 1990).

Empirical researchers have examined the nature and impact of deterrents in a variety of settings. The pronounced similarities in findings have led one leading reviewer to suggest that six robust categories of deterrents emerge in most settings and with most populations (Scanlan 1986). The categories are as follows: (1) individual, family, or home-related problems; (2) cost concerns; (3) questionable worth or relevance of educational opportunities; (4) negative perceptions of value of education; (5) lack of motivation or indifference to learning; and (6) lack of self-confidence. Table 10 illustrates items included in each category of deterrent.

Table 10—Examples of items used to measure the six main constructs emerging from the literature on barriers to participation in adult education

Individual, family, or home-related problems	Because I have trouble arranging for child care
	Because of family problems
	Because of a personal health problem or handicap
Cost concerns	Because I couldn't afford the miscellaneous expenses like travel, books, etc.
	Because I couldn't afford the registration or course fee
	Because my employer would not provide financial assistance or reimbursements
Questionable worth or relevance of educational opportunity	Because the available courses did not seem useful or practical
	Because I didn't think the course would meet my needs
	Because the courses available do not seem interesting
Negative perceptions of value of education	A high school diploma would not improve my life
	I just don't like school
	I didn't like school so I don't want to go back
	Because there are few incentives or rewards for participation
Lack of motivation or indifference to learning	I am not motivated enough to go back to school
	I am too old to go back to school
	Going back to school won't make me any smarter
Lack of self-confidence	Because I am not very confident of my learning ability
	Because I feel I could not compete with younger students
	Because I do not think I could finish the course

Sources: Beder and Valentine 1990; Blais, Duquette, and Painchaud 1989; Darkenwald and Valentine 1985; Valentine and Darkenwald 1990.

Recent work in the area of barriers to participation has moved from studying the factors that deter adults from participating to attempting to profile potential learners. This task is important because the impact of deterrents on participation varies according to the individual's characteristics and life circumstances (Scanlan 1986). A cluster analysis by Valentine and Darkenwald (1990) yielded five distinct types or groups of respondents: (1) people deterred by personal problems, mainly traditional homemakers with demanding life situations; (2) people deterred by a lack of confidence, for whom the dominant profile was mature adults whose personal resources and life circumstances would otherwise enable them to participate; (3) people deterred by educational costs, a group that was disproportionately female and younger than the sample as a whole and had modest incomes; (4) people not interested in organized education, for which the dominant profile was well-educated, affluent, employed, and male; and (5) people not interested in available courses, for which the dominant sociodemographic profile was quite similar to that of group 4, but who valued education more highly.

D. Policy Implications

Research in the area of barriers to participation is based on a core belief that knowledge about barriers will aid program planners and policymakers to increase program participation rates, increase the level of participation among those who already participate, and improve current programs. This body of research points out that potential participants are heterogeneous, comprising multiple market segments, and can best be reached when program providers tailor their approaches to both the motivations and characteristics that define each distinct group. For example, publicizing the program in specific geographical areas where the target population is likely to receive the information would be one way of reaching participants. Or, if support services (such as childcare, transportation, career counseling, and support groups for adult learners) are available, their existence could be publicized.

Whereas the research discussed here seeks to determine deterrents to participation in adult education, researchers have concluded that given the diversity of potential and current participants, planners should learn more about potential participants and the barriers that affect them. It has been suggested, for example, that ABE, which focuses solely on occupational advancement or monetary gain will not appeal to a large proportion of the target population that is more interested in general self-improvement (Beder and Valentine 1990). It is also recommended that more specific questions about barriers affecting Hispanic adults, rural inhabitants, and adults with low literacy levels be investigated (Hayes 1988, 1989).

There is also debate as to the efficacy, cost, and ethics of attempting to remove barriers to adult education. Many authors are optimistic about the potential for successfully removing deterrents to participation. It has been suggested that childcare should always be available, local charitable organizations should be involved in deferring costs, class schedules should be flexible to accommodate workers, transportation should be subsidized, and efforts should be made to address potential participants' self-image as learners. However, it is recognized that there are limits to policy interventions, and that costs, financial assistance, and lack of interest may be outside the program planners' ability to intervene. The cultural assumptions and ethics of persuading adults who are not interested in further education to participate also need to be examined (Wikelund, Reder, and Hart-Landsberg 1992).

V. Access to Lifelong Learning

A. Definition of Access

Equality of access is one of the three traditional aspects of equality discussed in education research. Equality of access, equality of opportunity, and equality of outcome are three possible approaches to the issues of equality in the education system. Equal access complies with the ideological approach of ensuring that individuals are not excluded from the system but recognizing that individuals must achieve success by their own effort once admitted. Merit-based definitions focus attention on academic indices (i.e., grade point average and standardized test scores), course unit standards, and the student's choice of college. Definitions based upon merit view admissions as color-blind and based only upon qualifications; if an individual works hard and is successful, that person will have every opportunity to obtain the best education possible. On the other hand, definitions involving social justice and equal opportunity contend that all parties involved must be temporarily color-conscious before they can become color-blind; this view focuses on affirmative action, class-based access, the ability to pay, and improving college eligibility. A third view of access to postsecondary education discusses alumni preference and athletic ability, two factors unrelated to merit or social justice and equal opportunity, which may grant students access to institutions of higher education (Ruppert et al. 1998).

In general, the definition of "access" in the context of postsecondary education in the United States is highly ambiguous, and access to lifelong learning activities, or adult education, has not been addressed as a separate entity. Part of the ambiguity stems from the variety of groups that compete to be the target of access issues; the focus now seems to be on underrepresented minorities and individuals from lower socioeconomic status (SES) backgrounds. However, other groups compete for access (e.g., the disabled, veterans). The definition of "access" in relation to postsecondary education is not only ambiguous but also somewhat inadequate; the inadequacies of current conceptualizations of the term were agreed upon by a panel convened by the National Postsecondary Education Cooperative (NPEC) of NCES. While the panel members conceded that a new *definition* may not be needed, they suggested how the meaning and use of the word could be improved in a *reconceptualization* of the study of access to postsecondary education (Ruppert et al. 1998). In order to fully understand the current state of access to postsecondary education, researchers, educators, and policymakers must comprehend the new array of "nontraditional"[1] students, who constitute more than half of all undergraduate students in the United States, and the changes they have created in educational conditions on campuses in the United States (Baker and Velez 1996).

Given these current aspects to the definition of the term, researchers generally agree that the concept should be expanded on two levels: enrollment must be linked to outcomes such as high achievement and attainment of personal goals, and the process by which the outcomes are reached must be assessed. Furthermore, the panel convened by NPEC has suggested specific components that must be further investigated to broaden the approach to access. First, a reconceptualization should include a more encompassing comprehension of postsecondary students to be sure to include the new majority of older, nontraditional students who are primarily part-time and nonresidential. A new understanding of access must also address where the education occurs, how the students enter the system of postsecondary education, what financial resources students have, when preparation for postsecondary education began, students' progress after they enter, the quality of students' educational experiences, and degree completion (Ruppert et al. 1998).

B. Existing Data

Without addressing the above questions, existing data do not yield an accurate picture of access to postsecondary education, or for adult education in general for nontraditional students. Nevertheless, existing data can provide some indication of trends in access to postsecondary education. The representation of African-American and Hispanic students among all undergraduate students reached the highest levels to date in 1995, composing 10.9 percent and 8.3 percent, respectively, of the undergraduate student population. The numbers of these minority students enrolled have also increased more rapidly than overall numbers (Ruppert et al. 1998). However, larger percentages of African-American, Latino, and American Indian students drop out of degree programs (Baker and Velez 1996). Substantial discrepancies also exist among the percentages of students from differing SES backgrounds who earn a bachelor's, master's, or first professional degree; students from wealthier families are more likely to graduate (Baker and Velez 1996; Ruppert et al. 1998). Some reports, however, claim that family economic background as a determinant in postsecondary achievement has lessened due to increased financial aid opportunities (Baker and Velez 1996). While these data may indicate increased access to higher education by showing growth among all students and for those in typically underrepresented groups, other indicators must be employed to gain an accurate and complete picture. Statements of improved access to higher education must remain conservative until research efforts are expanded (because of the increasingly unclear nature of attendance at postsecondary institutions) and must include outcomes (Baker and Velez 1996).

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[1] Definition provided by NCES—A nontraditional student was identified by the presence of one or more of the following characteristics: delayed enrollment into postsecondary education, attended part-time, financially independent, worked full-time while enrolled, had dependents other than a spouse, was a single parent, or did not obtain a standard high school diploma.

Some evidence exists for differential access to various types of work-related postsecondary education. Adults generally have good access to qualifying training, which is heavily school-based, due to both the abundance of state-subsidized community colleges with virtually no admission requirements and the wealth of financial aid for unsubsidized programs in private schools. However, financial limitations at state and federal levels affect the net costs of the training for individuals, thereby limiting access for students with economic constraints. Access to skills improvement training is even more inequitable; this type of training typically enrolls disproportionately low amounts of women, minorities, young people, employees of smaller firms, lower-level workers, and workers with lower levels of formal education. Limited access also exists for retraining through the two major federal dislocated worker programs due to the specific criteria for dislocated workers, financial appropriations, lack of income, and the rate at which assistance is provided. Eligibility requirements also limit access to second-chance training because of the focus on specific populations combined with insufficient funding for all individuals who meet the requirements (Hansen 1994).

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Attachment A: Summary of Federal Legislation

Several pieces of federal legislation currently affect adult learning, particularly adult basic education, in the United States. The laws that govern federal adult and vocational education programs include the National Skills Standard Act of 1994, the National Literacy Act of 1991, the Adult Education Act, and the Workforce Investment Act of 1998. Perhaps the most influential of these laws recently is the Workforce Investment Act of 1998 (P.L. 105-220), which has supplanted several federal statutes, including the Adult Education and Literacy Act, and substantially alters the role of the federal government in job training, adult education, and vocational rehabilitation.[1]

A. Adult Education Act

Before the passage of the Workforce Investment Act, the workforce development system in the United States was composed of several distinct programs, including the Adult Education Program. The Adult Education Act (AEA), an amendment in 1969 to the Elementary and Secondary Education Act of 1966, formally established a federal program in adult education. The act extended services originally established by the Equal Opportunity Act of 1964 for those 18 and older who had completed eight or fewer grades of school to include individuals ages 16 and 17 as well. Seeking to establish "education programs for adults ages 16 and over whose mastery of basic skills is insufficient to enable them to function effectively," the act funds states through the Basic State Grant to provide three types of instruction:

- Adult basic education (ABE) and literacy for adults below the 8th grade proficiency level;
- English-as-a-second-language (ESL) instruction for adults who lack facility in English; and
- Adult secondary education (ASE) for adults who wish to earn a high school diploma or pass General Educational Development tests (Kirshstein 1996).

B. Job Training Partnership Act (JTPA)

Expanding upon services offered by the AEA while targeting disadvantaged populations and displaced workers, the Job Training Partnership Act (JPTA) was enacted in 1982. This law allowed the Department of Labor to administer the primary federal program designed specifically for improving training and employability for those without jobs (Hansen 1994). The legislation has funded 28 different services that provide employment and training for economically disadvantaged youth, adults, and displaced workers (Kirshstein 1996). Disadvantaged youth and adults are served by Title II programs, for which states have primary responsibility (Hansen 1994). States also administer programs to provide further assistance for workers who have lost their jobs due to plant closings, industry cutbacks, and foreign competition through Title III (Hansen 1994; Kirshstein 1996). However, the federal government directly administers programs under Title IV for several special populations.

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[1] Although the Workforce Investment Act of 1998 was signed on August 7, 1998, the U.S. Department of Labor will most likely not issue regulations pertaining to the new law until early 1999. The Job Training Partnership Act (JPTA) will not be officially repealed until July 1, 2000.

1. Title II

Title II is similar to a block grant to the states, conferring important administrative responsibility to the states but allowing local bodies to decide whom to serve. States receive funds based on the number of residents in poverty and concentrations of the unemployed; about four-fifths of Title II funds are forwarded to over 640 service delivery areas throughout the nation based on the same factors. Overseeing each of these local areas are Private Industry Councils, whose officials select administrative agencies to run the programs. These agencies—the Council itself, a government agency, or a nonprofit organization—can provide services directly, but usually contract services out to schools, community organizations, and private vendors (Hansen 1994).

Within this partnership between state and local governments and private industry, eligible applicants can participate in various types of training, including on-the-job training, work experience, job search assistance, and basic education and occupational skills training in the classroom (Kirshstein 1996). Recipients of these services participate on a voluntary basis, hearing about them by word of mouth, from advertisements, or through referrals from welfare and employment agencies (Hansen 1994).

To ensure the quality of services provided to participants and to measure the results of local service delivery areas, performance standards were included in Title II. Local service delivery areas that fail to meet the standards are given technical assistance by the state and may ultimately be removed from JPTA. Successful areas are given financial awards based on the extent to which they surpass the standards. Standards have been modified over time to emphasize longer-term rather than immediate post-program results and to eliminate cost standards that encouraged agencies to serve the most job-ready and cost effective applicants. Amendments to the act in 1992 changed the performance standards to emphasize the actual acquisition of skills in addition to job placements (Hansen 1994).

2. 1992 Amendments to Title II

Changes to the performance standards were only one part of the amendments to the JPTA by Congress in 1992. Overall, the amendments emphasized targeting services, enhancing program quality, moving towards a comprehensive service delivery system, and increasing fiscal integrity. More specifically, changes to the law required individualized assessments of education, skills, and service needs of each participant to be able to tailor and individually manage service strategies and provide more intense and comprehensive services to each client. Concerned that too few of the recipients of these services were seriously disadvantaged, Congress required that 65 percent of the program beneficiaries not only be economically disadvantaged but also have at least one barrier to employment (i.e., basic skills deficiency, cash welfare payments, disabilities, homelessness, or criminal records) (Hansen 1994).

Amendments not only focused on program participants but also on the providers of services. They required better documentation of operating costs and stronger procurement and contracting procedures. Overall, the amendments promoted a greater level of coordination among human resource programs through support for state human resource investment councils (Hansen 1994).

C. Job Opportunities and Basic Skills Program

The JPTA and the Job Opportunities and Basic Skills Program (JOBS), established in 1988 as part of the Family Support Act, overlap in important ways yet are distinct programs. While welfare administrators often refer JOBS participants to local JPTA programs for training, JPTA often uses JOBS to pay for supportive services such as childcare and transportation. As part of a major reform of the nation's leading welfare program, JOBS was created to provide adults ages 20 or older who receive Aid for Families of Dependent Children (AFDC) with education, training, and employment to help avoid long-term welfare dependence. At the same time as this program requires recipients to participate in education and training in preparation for stable employment, it provides necessary supportive services such as childcare and transportation. Acting simultaneously as a service and a welfare reform program, JOBS has sought to mandate participation in welfare-directed services for those receiving welfare payment, but limited funding has restricted this conditional aspect of the program (Hansen 1994).

When developing state JOBS programs that will deliver services, states must follow broad guidelines established by the U.S. Department of Health and Human Services. All state JOBS programs must include four basic services: educational activities below the postsecondary level, job skills training, job readiness activities, and job development or placement activities. Additionally, state programs must include two of the following four components: group and individual job search, on-the-job training, work supplementation, or community work experience. Because these are the only requirements for state programs with no existing performance standards as in JPTA, states have great flexibility in program development and significant differences exist in JOBS programs among states. Overall, states have typically emphasized investment in human capital more than work attachment strategies. The largest JOBS component activity in many states is basic education (high school or GED completion and ESL). While much training occurs below the postsecondary level because many recipients of AFDC are high school dropouts, JOBS participants have two options for participation in postsecondary training. If the individual is not engaged in postsecondary activity but has been approved for enrollment prior to JOBS participation, he or she may be assigned by the state to a postsecondary program. Alternately, individuals enrolled in a postsecondary institution prior to JOBS participation may be eligible for support services after state approval of self-initiated education and training (Hansen 1994). Financing for JOBS programs is shared among federal and state governments. States, in order to bring down their portion of JOBS-capped entitlement, must provide matching funds. However, because of state budget constraints, states have not been able to draw down their entire allocation (Hansen 1994).

D. The Workforce Investment Act of 1998 (P.L. 105-220)

The Workforce Investment Act, signed into law by President Clinton on August 7, 1998, rewrites federal statutes governing programs of job training, adult education and literacy, and vocational rehabilitation, replacing them with streamlined and more flexible workforce development systems. Both the federal and local roles in job training and adult education were altered as a result of this legislation. The provision of services locally will be primarily through individual training accounts (vouchers) and one-stop career center systems, eliminating the contract-based system previously provided by the Job Training Partnership Act (Buonora 1998). Although the improvement of coordination between the workforce investment system and the adult education, literacy, rehabilitation, and vocational programs is a major emphasis of the law, individual programs are kept separate and distinct by their separate funding streams (Jensen 1998). The legislation encourages states to submit a "unified plan" to ensure the coordination of workforce development programs, such as those established through the Carl D. Perkins Vocational and Applied Technology Education Act, the Adult Education Act, the Vocational Rehabilitation Act, the Food Stamp Act, the Community Services Block Grant Act, and the Family Support Act (Buonora 1998).

1. State and Local Workforce Investment Boards

Seeking to improve coordination and guiding the local provision of services, state and local workforce investment boards established under the new law will develop and implement plans for local provision of services. The state workforce investment board will assist each governor in developing a 5-year strategic plan for the provision of job training services that will be submitted to the U.S. Secretary of Labor and develop the workforce investment system itself. In line with the state plan, the local workforce investment boards will establish local training policy, certify local one-stop operators, designate local providers of training services, and negotiate local performance measures (Buonora 1998).

2. Local Service Areas

Important to all local policy pertaining to the Workforce Investment Act are local service areas. When the governor designates these service areas, he or she must consider geographic areas served by local education agencies and postsecondary educational institutions, the consistency of such local areas with labor market areas, the distance required to travel for receipt of services, and local resources for the administration of effective job-training activities. Providers of job-training services are located within local service areas and must be certified by the local board with guidance by the governor. However, specific institutions within the designated areas, namely all those eligible to participate in Title IV student aid programs of the Higher Education Act, are automatically initially eligible to render job training services (Buonora 1998).

3. One-Stop Delivery Systems

Each local service area will establish a one-stop delivery system with neighborhood centers that provide core services for employment and training services funded under the Workforce Investment Act and other federal programs. The core services include outreach and intake, initial assessments of skill levels, job-search and placement assistance, career counseling, identification of job vacancy listings, assessment of skills necessary for jobs in demand, and the provision of information about available training services. Groups eligible for designation as a one-stop center are postsecondary educational institutions, employment service agencies, private nonprofit and for-profit organizations, and government agencies.

The program has a jobs first policy, i.e., the first priority is to get the individual into the labor force. If the core services fail, then intensive services are called upon; if this is not enough, then further training is authorized. This policy stands on its head older policies of automatically enrolling the participant in training programs before their employability is assessed. Core services, intensive services, and authorized training services are available to differing individuals. Core services, available to all adults, include outreach and intake, initial assessments of skill levels, job search and placement assistance, career counseling, identification of job vacancy listings, assessment of skills necessary for jobs in demand, and the provision of information about available training services. Those who are unemployed and are unable to obtain employment through core services may receive intensive services, which include comprehensive and specialized assessments of skill levels, diagnostic testing, in-depth interviewing to identify employment barriers, the development of individual employment plans, group or individual counseling and career planning, case management services, and short-term, prevocational services. Individuals who are eligible for intensive services but are still unable to find a job may qualify for authorized training services. These services include occupational skills training, on-the-job training, programs that combine workplace training with related instruction, skill upgrading and retraining, job-readiness training, and adult education and literacy activities combined with other authorized training services (Buonora 1998).

4. Individual Training Accounts (ITAs)

Individuals access the variety of services through individual training accounts (ITAs) or vouchers, choosing training among the qualified providers. States determine how the vouchers will be distributed in local areas and how much they are worth. The ITAs are used for all but a few training services (Buonora 1998).

5. Accountability

To ensure accountability within the new system, broadly defined performance indicators are established at the state level and local level. Indicators for adult and dislocated-worker programs at the state level include entry into unsubsidized employment, retention in unsubsidized employment 6 months after entry into employment, earnings received 6 months after entry into employment, and attainment of a recognized credential where appropriate. In addition to establishing performance measures at the state level, the law enacts customer satisfaction indicators consisting of employer and participant evaluations of services. If the state does not meet performance levels for each of the core indicators set by the governor and the U.S. Secretary of Labor for 1 year, it will receive technical assistance from the secretary. If failure to meet the measures persists for a second consecutive year, the secretary may reduce the state's funds by up to 5 percent (Buonora 1998).

The specifics of similar accountability measures at the local level are established jointly by the governor, the local board, and the chief local elected official. If a local area fails to meet the standards for 1 year, the governor will provide technical assistance. If failure persists for a second year, the governor must take corrective action, perhaps appointing a new board or prohibiting poorly performing training providers (Buonora 1998).

E. The Carl D. Perkins Vocational and Applied Technology Education Act of 1998

The purposes of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 are the following:

- further develop the academic, vocational and technical skills of vocational students through high standards;
- link secondary and postsecondary vocational programs;
- increase flexibility in the administration and use of federal funds;
- disseminate national research about vocational and technical education; and
- provide professional development and technical assistance to vocational educators.

(SOURCE: American Vocational Association. (1998). *The Official Guide to the Perkins Act of 1998: The Authoritative Guide to Federal Legislation for Vocation-Technical Education* (p. 63). Alexandria, VA: American Vocational Association.)

States must match funds awarded to them through basic grants of Title II of the Perkins Act. The funds, in turn, are distributed among secondary and postsecondary institutions within states in differing ways. While overall 38 percent of the basic grant funds in 1989 were given to postsecondary institutions, amounts varied among states from 8 percent to 100 percent. The funds are used toward curriculum upgrades, equipment purchase, instructor in-service training, guidance and counseling, and remedial courses. However, because these funds represent such a small percentage of the revenues of postsecondary vocational education programs, the federal money is spent mostly on equipment purchases rather than used toward large-scale changes (Hansen 1994).

The most recent reauthorization of the act not only restates how money is to be awarded to the states but also defines the nature of "tech-prep" programs. As defined by the Perkins Act, a tech-prep program combines secondary and postsecondary education to enable an individual to earn a 2-year associate degree or certificate. This is accomplished by providing technical preparation in the fields of technology, health, and business and by building student competence in mathematics and science. The training and support given through tech-prep programs ultimately leads to employment for the individual (Hansen 1994).

To ensure the effectiveness of programs that operate under the Perkins Act, states must develop and implement performance standards and measures. These should assess learning and competency gains in basic and advanced skills and outcomes of vocational programs, provide incentives for serving special populations, and profit from extant resources for performance assessment. Those programs that fail to meet the standards must provide and follow improvement plans (Hansen 1994).

Attachment B: National Household Education Survey

Attachment B is not included here. The reader is referred to the NCES web-site http://nces.ed.gov for a copy of this document.

Appendix C:
Commissioned Papers

Preface

In September 1998, the Commissioner of the National Center for Education Statistics (NCES) established a one-year task force to develop proposals on whether and how NCES should develop a data collection and reporting system on lifelong learning. To meet this goal, the task force established the following objectives: (1) summarize and prioritize policy issues concerning lifelong (or adult) learning; (2) synthesize existing data to address monitoring and policy needs; (3) identify and prioritize gaps in existing data; and (4) develop recommendations on data collection strategies.

The papers included in this volume were commissioned by the lifelong learning task force as part of its first objective, the identification of policy issues concerning lifelong learning. Papers were originally requested in six broad areas of interest: the social, demographic, and economic trends affecting lifelong learning; the acquisition of basic skills; service delivery in education and other institutions; the education of workers; educational technologies; and informal and avocational learning.

The task force selected to author these papers researchers who had demonstrated expertise in the area of interest. The authors were asked to delineate the most critical issues in their selected area, focusing on issues that are of interest to federal policymakers. The authors were also asked to discuss where national data to monitor an issue are lacking, and to provide recommendations on methods for collecting data on those issues identified as important but unanswered. Due to time constraints, two papers—those addressing "the acquisition of basic skills" and "educational technologies"—were submitted only in outline form and are not included in this volume. The remaining papers are included here as submitted by their authors. Specifically, these papers are:

- *Social, Demographic, Economic, and Technological Trends Affecting Lifelong Learning,* by David Bills, Associate Professor, Division of Planning, Policy, and Leadership Studies, University of Iowa
- *The Higher Education Provider in the Information Age: Data Implications*, by David R. Powers, Executive Director, Nebraska Coordinating Commission for Postsecondary Education
- *An Analysis of Four Workplace Trends and their Implications for Data Collection*, by Bonalyn J. Nelsen, Associate Professor, S.C. Johnson School of Management, Cornell University
- *Informal and Avocational Learning*, by Barbara H. Butler, consultant and former director of the National Science Foundation Informal Science Education Program.

The sharing of ideas embodied by this volume is one of the central ways in which NCES ensures that its data collections are relevant and appropriate. The lifelong learning task force wishes to thank these authors for contributing their thoughtful ideas and perspectives toward this end.

SOCIAL, DEMOGRAPHIC, ECONOMIC, AND TECHNOLOGICAL TRENDS AFFECTING LIFELONG LEARNING

by David Bills

INTRODUCTION: LIFELONG LEARNING IN A CHANGING SOCIETY

Consensus is rare in the educational policy community, but there are few doubters as to the continuing and increasing need for lifelong learning as the United States enters the next decade. By virtually any account, the provision of adult education and training stands as a crucial policy issue for the foreseeable future. Americans need to keep learning throughout their lives, not only because of the need to maintain themselves as productive workers, but also as active and engaged citizens, family members, and enthusiasts of all sorts (Kett 1994).

In this paper, I examine several social, demographic, economic, and technological trends that provide the context in which developments in lifelong learning will occur. I will be concerned particularly to establish an empirical base pertaining to issues that are important for policymakers. I will also try to highlight what we do not know and give some suggestions for how we might go about filling these gaps in the knowledge base.

Jacobs and Stoner-Eby (1998, p. 92) observed that "While many studies have noted the growth in the enrollment of older students, few have tried to explain why this enrollment increased." If explaining why past enrollment trends took place in such a widely studied area as undergraduate credential programs is difficult, it is that much more difficult to attempt projections across the full range of activities that count as adult education and training. There is little question that the data currently available to researchers and policy-makers pertaining to adult education is inadequate. I will include a discussion of the implications of these issues for national data collection efforts.

Definitional Issues

The phrase "adult education and training" covers an enormous terrain. Any concept that can potentially encompass enrolling in a Harvard MBA program[1] and taking a six-week course in ballroom dancing at a local community center could clearly benefit from some paring down. Kett captured this diversity well:

> "Exploring the history of continuing and adult education entails making sense of astounding statistics, frustratingly loose terminology, lofty idealism, and base huckstering. . .[It contains] a lexicon that includes such terms as continuing, adult, further, recurrent, popular, and second-chance education, as well as educational extension and, more recently, lifelong learning. With variations, all of these terms describe education attained after the apparent conclusion of conventional schooling. In the twentieth century the clients of schools devoted to this type of education have usually been over the age of 21, hence legally adults, but adult education is best defined in terms of its function rather than by a targeted age group. The distinguishing feature of

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[1] Even this apparently straightforward example shows the complexity of the scope of adult education. Harvard MBA now delivers much of its instruction through distance-learning technology. Students can acquire much of their coursework without setting foot in Cambridge.

> adult education has been its role in providing additional learning for those who believed that they had completed their education only to find that they desired or required more (1994, p. xi)."

As this quote indicates, problems of definition and measurement in the literature on adult education and training are well known. Examples are easy to find. The job training literature alone is massive, with a lively sub-literature on the conceptualization and measurement of both on-the-job and formally structured training (Zemsky and Shapiro 1994; Barron et al. 1997a, 1997b; Frazis et al. 1998; Collins et al. 1997). Similarly, delineating academic programs, non-credit enrollments, or certification and licensing programs brought about by the continuing growth of professionalization are all inherently uncertain enterprises. Finally, the range of activities that fall under the rubric of "adult literacy" or even ESL is enormously diverse.

The National Center for Education Statistics (NCES) has made considerable progress in conceptualizing the breadth of adult education with the Adult Education Component of the National Household Education Survey (NHES; see Kim et al. 1997). Their categorization included: 1) part-time participation in academic or vocational credential programs (generally accurately reported), 2) adult basic education (ABE) and basic skills courses, GED preparation classes, and adult high school programs focused on helping adults to improve basic reading, writing, and math skills or to prepare for a high school diploma or its equivalent (generally accurately reported), 3) work-related courses (fairly seriously underreported, see Brick et al. (1996)), 4) apprenticeships, 5) English as a Second Language (ESL) instruction (generally well-reported, but entailing logistic difficulty in reaching the full range of non-English, non-Spanish speakers), and 6) formally structured personal development courses (extremely diverse and with considerable underreporting). If not entirely unambiguous, this categorization should provide a useful starting point for future data collection efforts in adult education.[1]

Rather than try to reconcile all definitional and measurement problems in this report, I will follow the charge put forward in the "Commissioned Papers Work Request" by defining "lifelong learning as "all formal, informal, job-related, and avocational education adults receive after they have left full-time, formal education—which may include full-time, formal education after a break in education." This is more inclusive than such terms as "delayed school enrollment" (Jacobs and Stoner-Eby 1998), "post-compulsory," or the like. Because it includes full-time enrollment (or re-enrollment), it is also more inclusive than the already expansive NHES definition.

My task, then, is to consider several broad trends that are setting the stage for the future of lifelong learning. The categorization of these social, economic, demographic, and technological trends is inevitably a little arbitrary and is for analytic convenience only. In practice as well as in theory these trends affect and are in turn affected by each other. Before turning to these trends, I provide a little background on trends in adult education and training itself.[1]

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[1] Even within any given category the range of activities can be daunting. Hollenbeck (1996), among others, provided a careful but still preliminary categorization of various types of job-related training.

Trends in Adult Education and Training

Recent growth in enrollments in adult education is significant. Kim et al. (1995) used the Adult Education Component of the 1995 National Household Education Survey (one of the primary sources of information on adult education) to provide an overview of the extent of adult education in the United States. An earlier report by Korb et al. (1991) presented similar analyses using the 1991 administration of the NHES. Adopting a broad and inclusive definition of adult education, Kim et al. reported that about 40 percent of adults participated in some kind of adult education in 1995. (This number does not include full-time credential seekers.) Even after considering changes in the 1991 and 1995 NHES surveys, this was a substantial growth from the 32 percent reported for 1991 (Korb et al. 1991). The most common types of adult education in 1995 were in work-related courses and personal development courses. A sizable minority (about 9 percent) participated in more than one kind of adult educational activity.[2]

Korb et al. (1991) showed that in 1991 many of the factors that lead to educational inequalities during individuals' first spell in the educational system also lead to inequalities in participation in various kinds of adult education. While the specific patterns varied across different kinds of educational activities, individuals in their prime working ages, those in better jobs, and whites had more opportunity to participate. Participation in adult education was strongly and monotonically correlated with educational attainment. In most cases, the best predictor of participation in adult education is prior educational attainment. As Korb et al. summarized their results, "Those who could most benefit from adult education are the least likely to participate in it." Kim et al. (1995) replicated these findings with NHES:95 and Bills (1998) and Hight (1998) expanded them with more detailed statistical analyses.

Adult education contributes an appreciable share of the total volume of educational attainment. Jacobs and Stoner-Eby (1998, p. 100) reported that "approximately seven percent of the years of schooling completed by this cohort [white men aged 20-24 in 1970 - early baby boomers] was acquired at the ages of 25 and older" and that "for each of these race and sex groups, more than one-third of those who completed their college degrees did so at age 30 or older (1998, p. 103)." Jacobs and Stoner-Eby are speaking only of undergraduate credit programs. If one factors in the total volume of learning added by job training, personal development courses, apprenticeships, and the like, the contribution of adult education to the human and social capital of the nation is enormous.

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[1] Without denying their importance, I will not pay any attention in this review to legislative developments that are going to influence the provision of adult education, such as The Workforce Investment Act of 1998, The Adult Education and Family Literacy Act of 1998, or any of a large number of state or local efforts. It is likely too that changes in the welfare system will have implications for the provision of adult education. Assessing these matters would be a project in itself.

[2] None of this demonstrates whether there is in some sense too little or too much adult education. Certainly there is evidence that American employers are underinvesting in job training (Bishop 1997).

SOCIAL, DEMOGRAPHIC, ECONOMIC, AND TECHNOLOGICAL TRENDS AFFECTING LIFELONG LEARNING

The following sections delineate several broad trends that affect patterns and processes in adult education. Most of the literature on adult education, whether sociologically or psychologically based, focuses on the adult learner (Richardson and King 1998). That is, it seeks to understand the motivational or dispositional characteristics of individuals who elect to return to school after some hiatus. This is a valuable body of work, but not directly relevant to my purpose here. I depart from the focus on individual learners to concentrate instead on the social context in which adult learning takes place.

The Aging and High Educational Attainment of the Baby Boom Generation

The 1946-1964 baby boom is the fundamental demographic fact of our time. The sheer size of the Baby Boom has profoundly changed every social institution that it has passed through, from maternity wards and families in the immediate post-World War II years to retirement homes and cemeteries a few decades from now. Jones's (1991) characterization some years ago of the over 70 million baby boomers passing through social institutions as a pig passes through a python has held up well. At least potentially, the boom's impact on adult education should match its impact elsewhere.

The broad outlines of the Baby Boom are well-known and need not be explicated in detail here. The major point for present purposes is that the boomers are now 35-53 years old, generally considered the prime years of the work life. Presumably, this is the "niche" that people typically have in mind when targeting the market of potential adult learners. Aging baby boomers, whether using their affluence to seek personal development through adult education or alleviating their anxiety over corporate downsizing by acquiring more job skills[1], would seem to comprise an enormous potential pool of participants in adult education and training. Even if the *rates* of participation in adult education remain the same for the baby boomers as for previous cohorts, the sheer size of the cohort would seem to promise a huge *volume* of adult education.

The aging of the baby boom generation brings with it an aging workforce. This can be seen in the most recent series of socio-demographic projections by the Bureau of Labor Statistics. Bowman (1997, p. 3), drawing on an labor force projections to 2006 developed by Fullerton (1997), observed:

> "While overall change in the labor force will be modest, significant shifts are expected in its demographic structure. Increases will be concentrated among older age groups, as baby boom cohorts swell the ranks of workers between ages 45 and 64. For the first time in 25 years, the number of young workers

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[1] Increasingly, these are computer skills (Elman and O'Rand 1998).

> (16 to 24) will be growing faster than the overall labor force. Finally, a decline is expected in the number of those in the 25 to 44 year age range over the next ten years. The net result will be a continuation of the aging of the labor force seen in the previous decade. By 2006, the median age of the labor force will approach 41 years, a level not seen in the United States since the 1960s."

Not only is the baby boom cohort immense, but by historical standards it is remarkably highly educated.[1] So too of course are the post-boom (baby bust and later) cohorts, reflecting the long-term trend in the United States toward expanded educational attainment. Farley (1996, p. 335) described this well:

> "Americans have become more educated. The percentage of adults who finished high school rose from 55 percent in 1970 to 81 percent in 1994; the percentage of people who hold college degrees doubled from 11 percent to 22 percent. Young people are staying in school longer, too. The improved education of their parents, sustained government spending for schools, changing demands from the labor market, and new programs developed by local schools substantially reduced the dropout rate from secondary schools. About eighty-five out of one hundred young people now obtain high school diplomas or GEDs by their late twenties."

Despite some tendencies mitigating the expansion of higher education and the virtual universality of the high school diploma, the projections are that the trends toward higher levels of educational attainment will continue. Estimates from *Projections of Education Statistics to 2007* (Gerald and Hussar 1997, p. 6-7) are that "High school graduates from public and private high schools are projected to increase from 2.5 million in 1994-95 to 3.0 million by 2006-07, an increase of 21 percent." Assuming that the college-going rates of these high school graduates maintain their currently high level (and as I argue below, there is every reason to expect that they will), this suggests over the long-term a continued, if slower, growth in the population "at risk" of participating in adult (or at least post-compulsory) education.[2]

One of the major determinants of participation in adult education is prior educational attainment (Bills 1998). For a variety of reasons, those who are already highly educated are those most likely to return for further schooling. Everything else being equal, then, it would seem that the greatly enhanced educational attainment of the American population would create even greater demand for adult education.

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[1] Baby boomers are not only educational consumers, but are also the most highly educated generation of parents in history. There is probably no firmer finding in the sociology of education than the relationship between parental education and the educational achievement of their offspring. Everything else being equal, the eventual educational attainment of the children of the baby boomers is likely to be extraordinarily high.

[2] There are substantial variations in these projections by region of the country. The report states that "the West is expected to rise by 29 percent. The Northeast is projected to grow by 23 percent. The South and Midwest are expected to increase by 20 percent and 14 percent, respectively." I will have more to say below on regional variations in processes pertinent to adult education.

Contrary to what many seem to assume, however, the effects of the baby boom on the total volume of adult education may have already more or less run their course. The apparently widely held expectation that the aging of the baby boom generation will bring with it an explosion of adult education enrollments hinges on baby boomers behaving differently than previous cohorts by returning to school more regularly as they move into middle age. There is little indication that this is going to occur. In a comprehensive analysis of this, Jacobs and Stoner-Eby (1998, p. 98) concluded that "For men, then, it is clear that an increase in the enrollment of older college students between 1970 and 1990 was due to changes in the age structure of the population, rather than changes in age-specific enrollment rates. For women, the aging of the baby boomers reinforced the effect of increasing age-specific undergraduate enrollment rates."[1] In other words, college enrollments of male baby boom adults swelled not because boomers were more likely than previous generations to return to school, but rather simply because there were so many of them. The enrollment of baby boom adult women, on the other hand, grew both because of their vast number and because they enrolled at higher rates than previous generations.

Either way, though, Jacobs and Stoner-Eby see little reason to believe that boomers are likely to maintain these high rates of re-entry. They note that "These changes are not just an interesting window into the recent past. They also hold important implications for the future, because changes in the age structure will have the opposite effect over the next decade." (Jacobs and Stoner-Eby 1996, p. 97). What this means is that the baby boom cannot be counted on as a vast and relatively untapped source of adult enrollments, unless its participation rate increases dramatically, and there is no particular reason to expect it to do so.[2]

The Changing American Lifecourse

Demographers conceptualize the lifecourse as the regularized patterns of transitions and roles that individuals experience as they age. The study of the changing American lifecourse has become a central preoccupation in contemporary American demography (Shanahan et al. 1997, 1998). The normative lifecourse of late twentieth century Americans has shifted from a generally routine and predictable set of transitions (e.g., from student to worker, from spouse to parent) to one in which lives are more "disorderly" (Rindfuss 1991), and in which people simultaneously hold a variety of roles (student, parent, workers, etc.). The consequences of these changing patterns of enrollment are far-reaching (Nock 1993).

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[1] Jacobs and Stoner-Eby drew on a range of data sets. These included the Integrated Postsecondary Education Data Systems (IPEDS), the U.S. decennial censuses, and the School Enrollment Supplements of the 1970, 1980, and 1990 Current Population Surveys.

[2] Jacobs and Stoner-Eby's analysis, of course, pertains solely to undergraduate college enrollments for credit. They says nothing about other sorts of adult educational activities, and acknowledge that they "understate the extent of adult educational investments" (Jacobs and Stoner-Eby 1998, p.106). If in fact the unprecedented exposure to formal schooling experienced by the baby boomer generation has instilled in them a greater "taste" for formal instruction than previous generations, we may well see increases in personal development or other non-credit course-taking.

At one time, it made sense to conceive of the American life course as including a discrete point at which individuals severed their participation in formal schooling and assumed other adult roles. This model was never universal, but captured a sequence that was so broadly experienced as to be virtually normative. More recently, the sequence of educational spells within the life course has changed in ways that make this formulation less useful for understanding the place of schooling in socioeconomic attainment. The notion of a single "school to work" or "school to family" transition in an individual's demographic career has been replaced by a persistent if irregular mobility between these diverse roles. Participation in adult education (or variously, lifelong learning, postcompulsory schooling, or continuing education) is now perhaps more prevalent than is the pattern of formal schooling ending at a discrete point (Coleman 1984; Hogan 1981; Pallas 1993).

Demographers and other lifecourse researchers have demonstrated the growing fluidity of schooling in the socioeconomic life course (Rindfuss et al. 1987). Interspersed spells of schooling with work and family are not new (Kett 1994), but the extent of and variation in adults' participation in education is evidently on the rise. Rindfuss et al. summarized research showing that "the time after high school is actually fluid and reversible" (1987, p. 786). Likewise, Hogan (1981) found a steady decline in the proportion of American men across this century who completed all of their schooling prior to beginning regular jobs and getting married (see also Hogan and Mochizuki 1988; Pallas 1993, p. 418; and especially Felmlee 1988 on the educational reentry of women). Using the National Longitudinal Study of the High School Class of 1972 (NLS-72) to examine the experiences of individuals in their first 12 years after high school, Rindfuss (1991, p. 498) found remarkable variability in the transitions experienced by young adults. While conceding that the evidence is not entirely conclusive, Rindfuss noted that "the general rise in educational attainment in the twentieth century probably has brought about some increase in diversity [of the order in which transitions across social roles takes place]" (1991, p. 500). He added that "an orderly young adulthood (that is, continuous work, or school followed by continuous work) is the exception rather than the rule for this cohort" (1991, p. 501). Women, because of the roles of child-bearing and homemaker, had even more diverse experiences than did men. Rindfuss maintained that transitions for both men and women from the role of student to that of worker have become more "blurred" and less "crisp" over the past generation.

Light (1995) reported similar findings (at least among White men) using administrations of the National Longitudinal Survey of Youth (NLSY) from 1979 to 1989. She found that 35 percent of White men who left school returned within ten years, with 11 percent returning more than once. Because many men re-enter schooling even later in life, Light noted that her figures represented lower-bound estimates of discontinuous schooling. She further reported that spells of returning to school were typically quite short.

Pallas (1993, p. 421) observed that we lack research on race, ethnic, and social class differences in life course patterns. In one of the few studies of this, Coleman (1984) showed greater "complexity and overlap" in the educational and work careers of White men than Black men, and observed that this typically worked to the economic disadvantage of Black men. We need more research on variations in the life course across such key lines of social stratification as race, ethnicity, social class, and gender.

The Changing American Family Structure

American families are fundamentally different than they were just a few decades ago (Levitan et al. 1988). These changes are both broad and deep, but I wish to focus here only on how they help form the context for the pursuit and provision of adult education.

Most of the attention given to the changing American family structure has focused on the consequences of these changes for the well-being of children (Furstenberg and Cherlin 1991). We now have a well-developed research literature on the effects of changes in family structure on children's cognitive development, anti- and pro-social behavior, and academic achievement.

These same changes in family structure, however, might well lead to changes in the life events of the adults who are experiencing them, although there is little research that investigates this. The shifts in family structure between 1980-1996 described by Farley (1996, p. ix) as "involving delayed marriage, more divorce, more childbearing by unmarried women, and more cohabitation, [so that] adults spend fewer years as spouses, and children less time living with both parents" all have the effect of altering the amount and distribution of time available to adults for pursuing adult educational activities. To my knowledge, there is no empirical research on the extent to which adults living under this new regime of family structure use their time and resources when they are not with spouses or children to pursue educational opportunities. Variations by gender and availability of socioeconomic resources (or social capital) would need to be considered in any such analysis.

One consequence of changes in family structure (as well as of the changes in lifecourse patterns described above) is that women now acquire more education than do men (Spain and Bianchi 1996; Mare 1995).[1] Spain and Bianchi (1996, p. 52-53) observed:

> "The data reveal a number of other trends in women's higher education. Where once, college was a transition from a parents' home to a home (and family) of one's own, a college education now frequently occurs at a later stage of life. Women aged thirty-five and over form a much larger proportion of all women students today than in 1972 (and significantly outnumber older male students). Women during the 1980s also were more likely to attend

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[1] There are other reasons for this too, such as the decline in male college enrollments associated with the phasing out of the military draft. These need not detain us here.

> college part-time than during the 1970s and were more likely than men to be part-time students. These developments suggest that instead of a transition *between* two life stages, school enrollment simply adds to the burgeoning layers that characterize women's lives." The ability of women to overtake men in total educational attainment is in large part because they are much more likely than men to re-enter schooling later in life. (In fact, the great bulk of the research on educational re-entry pertains to women.) To a significant degree, adult education, at least as it is reflected in participation in degree programs, has been feminized in the past two decades."[1]

Another consequence of changes in the American family structure is a decline in the economic dependency ratio. Fullerton (1997, p. 37) defines this as "the number of those in the total population (including Armed Forces overseas and children) who are not in the labor force per 100 of those who are in the labor force." In other words, the ratio estimates the extent to which the working population supports the non-working population. Because of the aging of the population, women's increased labor force participation, and declining birth rates, the economic dependency ratio dropped 31 percentage points between 1975-1996. It is projected to continue to drop for the foreseeable future. While the consequences of this for adult education are not entirely clear, it does raise again the possibility of increases in the time and other resources that are available for adults to pursue educational activities.

The Growing Ethnic and Racial Diversity of the American Population

The American population is growing increasingly ethnically and racially diverse. The nature of this is easily misunderstood. Turn of the nineteenth and twentieth century America was in its own way far more ethnically diverse than it is today. In many major cities of the time, two-thirds to three-quarters of school aged children had foreign-born parents. The pressure that this put on not only public schools, but on widespread and ambitious efforts to provide adult education to "Americanize" these parents, was intense.

Still, the racial and ethnic composition of the population is changing, and it is changing most rapidly for younger cohorts. The ongoing development of a post-industrial economy brings with it the need to provide ever broader and deeper job skills to historically underrepresented minority populations. Because the fastest growing segments of the American population are groups whose native language is not always English (Hispanics and Asian Americans in particular), it also brings a far greater demand for ESL and related sorts of instruction among adults. While data on this are scarce, there are numerous anecdotal reports of waiting lists for seats in ESL classes in many parts of the country.

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[1] In some contrast, the participation of women in job training programs is a contested issue in the empirical literature on training. There is good research that shows that women get more job training than men, less job training than men, and roughly the same amount of training as men (Lynch 1991; Brown 1990). Much depends on the age range of the sample and the definitions of job training. In perhaps the best recent research on gender differences in job training, Knoke and Ishio (1998) reported that unless statistical models are properly specified, it is easy to misleadingly conclude that women experience no disadvantage in access to training.

Many racial disparities in educational attainment have narrowed in recent years, although on many indicators the gaps are still wide. African Americans and Whites now graduate from high school at very similar rates. However, as Dervarics (1998, p. 3) observed, "According to new U.S. Census Bureau data, both African American and Hispanic young adults graduate from college at much lower rates than whites.[1] And young Hispanic adults are much less likely than their White or African American counterparts to finish high school."[2] Foreign born Hispanics are about three times as likely to drop out of high school as are native born Hispanics, and native born Hispanics who speak no English at home drop out at much higher rates than those who do. Dervarics paraphrases Deborah Wilds (co-author of "Minorities in Higher Education," an annual status report published by the American Council on Education) as follows:

> "While politically potent, such data should not spur educators to drop bilingual education in favor of "English only" programs, a prominent issue in many states...Instead...educators and policy makers should design flexible programs that serve Hispanic students of various backgrounds, cultures, and linguistic preferences."

My purpose here is not to propose policy solutions for better serving minority adult populations. Rather, I want to emphasize that the context in which future adult educational initiatives will proceed is one in which racial/ethnic, cultural, and perhaps in particular linguistic diversity is going to be ever greater. If lifelong learning becomes more socially prominent, and it gives every indication that it will, and if a basic high school education is a prerequisite for successful participation in many kinds of post-compulsory adult education and training, then racial and ethnic disparities in educational preparation will become an increasing crucial feature of the adult education landscape.

Changes in Technology, the Workplace, and Labor Markets

Changes in the American workplace over the past couple of decades have been far-reaching. Recounting these in detail is perhaps beyond the scope of this paper, but not by much. Virtually every major workplace change would seem to have important educational implications, whether on the K-12, post-secondary, or adult levels. I will highlight only a few changes here, and refer readers to a wide literature in this area (Bills 1995; Cappelli et al. 1997; Ritzer 1989; Piore and Sabel 1984).

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[1] There is some evidence, particularly in the South, that the racial composition of many higher education institutions has changed more slowly than had been anticipated ("Gains in Higher Education Limited for Southern Blacks" 1998).

[2] While it is misleading to think of "Asian American" as an undifferentiated category, the high educational attainment of this group is firmly established. Of course this is not true of every Asian American subpopulation.

Perhaps the most widely acknowledged change is the transformation of the American occupational system from a pre-industrial (agricultural) to an industrial (manufacturing) and finally to a post-industrial (information) society. The proliferation of terminology is rampant here, including any number of variations on service society, knowledge society, and information society. What has happened, of course, is, first, a shift of the economy out of some sectors of activity into others, thus reorganizing the mix of occupations and industries and, second, substantial changes in the nature of work in virtually all occupations and industries. Thus, both the distribution of jobs and the nature of those jobs has changed over time.

Sociologist Stephen Barley (1992, p. 4) characterizes the occupational trends over time as the "technization" of the workforce. By this he means to emphasize that contemporary work is rationalized and information-driven more than it has ever been (see also Bell 1973). For Barley, what we have witnessed is not simply a reshuffling of jobs, but a transformation in what work is.

Many of the most important changes in work are driven by changes in technology, most importantly electronic information technology. Of course, breathless and hyperbolic accounts of how technology will transform the workplace are nothing new. Every era has its observers who are only too willing to pronounce their era as experiencing technological change at an unprecedented pace.

The difference between analysts then and analysts now is that now they may be right. Even such careful and insightful observers as Barley (1992) see the changes in the world of work now as fundamentally different from what has come before, at least since the second industrial revolution of the late nineteenth and early twentieth century (see also Bell 1973). For Barley, contemporary technological change—in particular computer-based information technology—is not merely *substitutional*, which he defines as "the replacement of an earlier technology by a more efficient or effective successor" (Barley 1992, p. 7). Historically, most technological changes are substitutional. In contrast, we are now experiencing the more rare and more profound sorts of technological changes that are *infrastructural*. Barley sees these as "the relatively small set of technologies that form the cornerstone of a society's system of production during a historical era." Thus, contemporary technological change is best seen as comparable to the advent of steam power rather than as incremental improvements in existing technologies.[1] For Barley, "The ramifications of a computational infrastructure are potentially staggering" (Barley 1992, p. 8; see also Zuboff 1984).

What this suggests is that contemporary workplaces are "information-rich" or "info-mated" in ways that demand greater ongoing learning on the part of employees. To prosper in this new environment, workers need increased understanding of and access to information and information technology.

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[1] In other words, as Barley explains, computers are not merely efficient typewriters, nor is electronic communication simply a faster way of moving the mail.

Despite the power of information technology, however, it does not change of its own accord. Rather, it is adopted and implemented in particular organizational settings for particular strategic reasons. Managerial practices have a great deal to do with how information technology is infused throughout the workplace, and hence have much to do with the kind of adult education and training needs that are entailed.

The evidence is that the changes in managerial practices throughout the American economy have been far-reaching and are perhaps as important as the technological changes (with which of course they are inextricably bound) themselves. Bailey (1995) characterized this set of organizational or managerial changes as a move from a "mass production" model of standardized products and standardized, relatively underdeveloped worker skills to a "high performance model" of highly skilled and intellectually engaged workers employed in flexible and fluidly defined work settings.

The transformation of American firms to the high performance model has perhaps progressed further than is often acknowledged. Osterman's (1994) survey of American business firms reported that surprisingly high numbers had adopted at least some of the practices typically associated with the high performance model.

Some of the upward pressure on labor markets has come from technological innovation and infusion, as described above. More still has come from intensified processes of globalization and the "internationalization" of labor markets. Economists have reached little consensus on the extent and nature of this, although most would agree that trade-induced shocks have at least short-term effects on the well-being of American workers (Freeman 1995; Richardson 1995). The increasing competitive pressure on American employers - production and service sectors alike - will require an ongoing investment in their workforces.

All of these processes—occupational shifts, technological change, managerial restructuring, globalization—have had the effect of substantially transforming American labor markets. Much has been written about changes in the American labor market or, perhaps a bit more dramatically, the American class structure. Surely many of the more sweeping pronouncements of the two-tier society or the declining middle class or the hourglass society have been exaggerated. What does seem clear, though, is that the costs to being without marketable job skills in the post-industrial society are great. Far more than in an industrial, mass production age, the demands of the modern workplace are unforgiving. As Farley stated, "economic trends since 1973 have greatly benefited persons with technological training and specialized skills but have led to stagnant or declining wages for much of the labor force. Hence, we are in an era of economic polarization (1996, p. ix)."[1]

What this polarization means is the steadily deteriorating life chances of less educated workers resting unsteadily with the relatively more secure prospects of more educated ones (Blackburn et al. 1990). While the wages of the less educated have plummeted (both relatively and absolutely) for the past generation, "in the 1980s, the only major groups to experience real improvements in earnings were those with college educations" (Farley 1996, p. 229).

Projections from the Bureau of Labor Statistics indicate that the pressure on labor markets will continue. Bowman (1997, p. 5) discussing projections to 2006, commented "employment in occupations requiring an associate degree or higher will grow considerably faster than those with lesser educational requirements." Silvestri (1997, p. 81-82) provides a lot more detail on this. Particularly when coupled with the projection that "The gradual slowdown in the rate of labor force expansion continues to be one of the fundamental forces shaping the employment outlook," (Bowman 1997, p. 3), the costs of being without marketable skills are severe.

This is not simply a case of being without marketable credentials. At one time, critiques of credentials and educational inflation - the idea that employer demands for credentials far outstripped the skills they actually needed at the workplace - were very compelling (Berg 1971; Brown 1995; Collins 1979; Thurow 1975). There probably was a time when employers insisted on educational credentials that had little demonstrable correspondence with the ability to learn or perform on the job. These critiques seem less forceful today. Pryor and Schaffer (1998), for instance, showed that a college education only pays off economically if graduates have acquired the literacy skills commensurate with that education. In other words, credentials without skills are of ever-lessening market value.

While some skeptics remain (many of whom make quite convincing cases; see for example Texeira and Mishel 1995; DiTomaso and Friedman 1995), there seems to be broad consensus now that the answer to Cappelli's (1992) question, "Are Skill Requirements Rising?" is a clear "yes." Osterman (1995) added the important proviso that skill demands are rising more for some groups than for others, as professional and managerial jobs are being upgraded more rapidly than traditional unskilled and semi-skilled positions. Precisely what these flexible skills are or how they should be taught is still not entirely clear (although some good work has been done; see for instance Murnane and Levy 1996). In any case, research, analyses, and forecasts of the relationship between the skills that individuals acquire in school and the demands of the emerging world of work has become a sizable cottage industry.

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[1] There is an enormous, complicated, and in many ways still inconclusive literature on trends in the American income distribution. What are on the surface easily resolved technical distinctions (e.g., household or individual income, wage earnings or total income, years selected as baselines) have fundamental effects on the results. Moreover, trends toward polarization, inequality, and a declining middle class do not necessarily move in tandem. Wolfson and Murphy (1998) show that the polarization of incomes in the U.S. (and Canada) actually fell between 1985-1995, after rising between 1974-1985 (although inequality continued to increase during this period).

It needs to be remembered, however, that the American workplace is incredibly diverse (Licht 1988). For every trend toward the admittedly consequential high performance workplace with its ever-expanding demand for sophisticated skills, one can point to a potentially countervailing trend. There have been breaches in the social contract between employees and employers that have led to lesser rather than greater needs for skills (Spenner 1985). One need only consider the growing use of temps, the marginalization of much of the labor force, the use of contingent or flexible workers (Clinton 1997), or the proliferation of jobs that pay less than a living wage to see this.

None of this, though, obviates the main claims that the modern workplace is demanding much more of workers than it once did. Skills matter more than they used to. Given what Mare (1995, p. 165) called "the increasingly competitive pressure to maintain one's competitive position in the work force," there is little question that the prosperity of those at both ends of the labor market depends on the constant infusion of new learning opportunities.

Most analyses of the "skills gap" that has ensued from this emphasize the needs of both K-12 and postsecondary education to do more to provide the kinds of skills needed in the post-industrial age. Any reasonable solution, however, would seem to demand attention to the provision of skills to those already in the workplace. As Barley (1992, p. 1) summarized the *Workforce 2000* report (Johnston and Packer 1987), "older workers are said to lack the educational background requisite for retraining." Even more to the point, Bishop (1998) contended that efforts to narrow the skills gap by providing more general skills to students (as opposed to occupationally-specific skills to adults) are misguided. For Bishop, employers (not schools) are in the best position to identify the skills demanded by the modern workplace and to oversee the mechanisms by which they are taught.

The Movement of People

Virtually all of the processes described so far in this report have a regional dimension of some sort. Regional variations across the United States continue to matter a great deal. Indeed, there remain throughout the United States not only markedly different patterns of work and employment, but surprisingly large variations in even basic demographic character (Morrill 1990).

With the long-term trend toward lower birth rates, immigration has become a major source of both population and labor force growth in the United States (Bowman 1997, p. 3). What is often not acknowledged about immigration is that its effects are less national than local in scope. Any appreciable volume of immigration can change the nature of a geographically small place, not only ethnically but especially in terms of age structures, in a very short time.

Immigration can also change the educational structure of an area very quickly. As Farley (1996, p. 175) noted, "Immigrants have educational attainments unlike those of natives; they are greatly over-represented in the upper and lower tails of the educational distribution." Thus, a local area can in fairly short order find itself needing to provide either GED, basic skills, and ESL classes, or finding ways to provide sophisticated and specialized training to already highly educated professionals.

As important in many ways as immigration is internal migration. Americans frequently change locations in response to educational or economic opportunities, and this flow of people in turn affects the demands for lifelong learning in any given location. As Farley (1996, p. 288) noted, "the likelihood of making an interstate move increases with educational attainment." The result is that some parts of the country (for example, the Florida Coast from Miami to Jacksonville, or such cities as Las Vegas or Sacramento) are attracting large numbers of highly educated in-migrants, while other areas (especially older industrial centers) are losing the highly educated.

Other internal migration trends are also in evidence. Reversing long-standing historical trends, Blacks are now moving to the South in large numbers (Frey 1998). These trends are projected to continue to the year 2025, perhaps significantly altering the mix of adult educational needs and demands in the South.

The distribution of Asian-Americans across the United States has also changed quite dramatically in the 1990s ("Growth and Diversity Dramatic Among Asian American" 1998). In addition to the increasing diversity of the Asian American population and its sustained growth (expected to double by 2010) it is also becoming far less geographically concentrated. While still concentrated in the western United States, this degree of concentration has greatly declined and is projected to continue to do so.

What all of this means is that the demands for adult education and training will differ across the United States. It also means that efforts to collect national data on adult education need to pay close attention to regional variations, which potentially runs into some problems with confidentiality.[1]

The Increasing Costs of Higher Education

At the same time that the costs of not having a higher education of some sort are increasing, the costs of getting one are increasing as well. This is forcing students into a different calculus of decision-making between institutions and programs. As Farley (1996, p. 229) explained, "But in the 1980s, college costs went up much faster than inflation, making it more difficult for many students to get advanced degrees and encumbering many college graduates with substantial debt. Between 1980 and 1993, the cost of tuition, room, and board went up 37 percent faster than inflation at public colleges; 62 percent faster at private ones."[1]

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[1] My discussion here pertained to differences across broad geographical regions of the nation. Other spatial patterns (e.g., urban/suburban/rural) are important as well.

The full burden of increased tuition costs is not experienced equally. Hauser (1987) provided evidence that rising college costs negatively affected the educational opportunities of Blacks more than Whites. A study using the National Postsecondary Student Aid Study and the American Freshman Survey ("How Do Costs and Discounts Affect Institutional Choice?," 1998) showed that tuition increases are hardest for low income families to absorb and that increases in financial aid have been insufficient to offset increases in tuition.

There have unquestionably been some trends (and there are certainly projections) toward a more fragmented and some would say restratified system of American higher education as a result of these escalating costs. McPherson and Schapiro, in fact, found that at the highest income levels, there was a discernable movement of students away from public two-year schools, and at the very upper level, a movement away from non-selective to highly selective four-year institutions. In contrast, at the lowest income levels, students are shifting away from non-selective four-year schools and toward public two-year schools. This shift of the least well-off to the lowest cost provider may make sense in market terms, but violates many principles of the provision of higher education in America.

The shift toward community colleges and the resultant growth of these institutions has without question been one of the fundamental educational trends of the past several decades (Dougherty 1994). Here too data are scarce, but there are indications that the transfer function of community colleges is reasserting itself as students seek ways to ease the costs of the first two years of college before transferring to four-year institutions. Coinciding with the growing importance of what Grubb (1996) calls the "sub-baccalaureate" labor market, the enormous volume of non-credit and typically non-tuition instruction offered at these institutions, and the apparent focus of President Clinton's workforce policy on community colleges, their future role in the provision of lifelong learning would seem to be a crucial one.

New Forms of Delivery of Specialized Skills and Training

The changes within the higher education sector are perhaps as important as the external trends that have been outlined in this report. The market for advanced skills and credentials has responded to the increased costs of higher education, the growing availability and affordability of technologies for distance education, the increasing diversity of the student population, and the overall vocationalization of higher education by creating a bewildering array of new forms of instructional delivery. Whatever monopoly four-year colleges and universities ever had on American higher education has proven to be historically short-lived.

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[1] Farley (1996, p. 128) added that during this same period, housing costs were rising rapidly while the salaries of young workers were declining. The result was that "more students lived at home rather than in dormitories or in their own apartments. The percentage of 18- to 24-year old college students living in dorms fell from 26 to 22 between 1980 and 1990." See also Nock (1993). Many students are responding to the increased costs of postsecondary education by pursuing more paid employment.

Whether the changes in higher education are characterized as diversification or as fragmentation, we lack a generally accepted set of categories for classifying this emerging array of instructional providers. Specialized skills and training are now offered through a range of institutions and settings that include, among others, corporate universities, company certification, state-supported customized labor training, and largely unregulated and diffuse Web-based instruction. (Kett's "lofty idealism and base huckstering" come to mind). Grubb (1996, p. xv), referring only to the sub-baccalaureate labor market, mentions community colleges, technical institutes, area vocational schools, proprietary schools, shorter-term job training programs, and firm-based training paid for in part by public funds (see also Hollenbeck 1993).

Along with these emerging ways of delivering instruction is a great deal of uncertainty about the certification of the learning that presumably takes place, with numerous challenges to the traditional post-secondary credentialing system. The legitimacy of a credential awarded by a corporation that has identified needed skills and designed the means to deliver them (a so-called "competency-based" credential) seems straightforward enough, if probably often contested in practice. That of an Internet provider accountable to no particular accreditation agency or other form of oversight is something else.

The technology available for distance education alone promises to rapidly alter the world of adult education. Once again, systematic and nationally representative data are scarce. Some useful information comes from the 1995 NCES Survey of Distance Education Courses Offered by Higher Education Institutions. This report used the Postsecondary Education Quick Information System (PEQIS). The authors of the report defined distance education as "education or training courses delivered to remote (off-campus) locations via audio, video, or computer technologies" ("Distance Education in Higher Education Institutions: Incidence, Audiences, and Plans to Expand" 1998, p. 1). They found that 58 percent of higher education institutions either offered distance education courses or planned to do so in the next three years. This was, though, overwhelmingly a trend of the public rather than the private educational sector. Very few private institutions had at that time made serious inroads into the provision of distance education. If informal observation and anecdotal evidence are any guide at all, however, this is changing rapidly and will almost certainly continue to do so.

There is also a regional dimension to the use of distance education. The NCES survey reported that relatively few institutions in the Northeast had implemented distance technology. This is not terribly surprising. Certainly Midwestern and Plains states, with highly dispersed but generally well-educated populations, face the most urgency in devising systems of distance education.

Finally, the study found that the most common audience for distance education consisted of both professionals who were seeking recertification and other workers seeking skill updating or retraining.

Once again, one should beware of the pronouncements of "visionaries" when large amounts of money are at stake. Still, distance education is potentially revolutionary. It does have the potential of realizing Daniel Bell's (1973) vision of a post-industrial society that has overcome many of the restrictions imposed by time and space (at least the educational ones). Ultimately, the point is less whether the University of Phoenix or Western Governors University survive and prosper than it is the fact that something like these institutions will in time become major players in adult education and training.

RECOMMENDATIONS

The charge put forward by the Lifelong Learning Task Force in its "Commissioned Papers Work Request" states "The paper should discuss where national data to monitor an issue (e.g., levels of participation) are lacking, and should provide recommendations on methods for collecting data on those issues identified as important but unanswered. Of particular interest are data that could feasibly be collected using *national surveys or assessments* (rather than via evaluations or research studies)."

The social, economic, demographic, and technological trends indicated in this report raise many challenges for the collection of useful data on adult education and training. In this section I discuss some areas in which some of the more severe gaps in our knowledge could be addressed with national surveys or assessments. It is always, of course, easier to recommend the *kind* of data that we need (e.g., longitudinal, linked with providers, or whatever) than to specify the actual data that we need. I will try to keep this in mind and establish a few principles for research needs on lifelong learning.

I will discuss my recommendations under five broad headings.

1. *Acknowledge the enormous breadth of adult education and training activities*

We need to acknowledge the enormous range of activities that can potentially qualify under the umbrella of adult education and training. As stated above, the Adult Education Component of NHES provides an excellent template for classifying these, but even here some ambiguity remains. Few would doubt that an individual systematically yet informally watching the History Channel is engaging in adult education, yet any operational definition expansive enough to include this activity in a national survey risks being overwhelmed with detail.

This is not to say that such activities cannot be measured as least as well as we measure more formal educational participation. The issue, in fact, has been anticipated in the job training literature. Analysts of the workplace have long noted the distinction between formal job training, which is generally quite observable, and on-the-job training, which is built into the day-to-day tasks and social relationships of the job itself. Perhaps surprisingly, it turns out that we can measure it as accurately as we can formal training (Barron et al. 1997a, 1997b).

The situation would seem to be analogous with learning that takes place off the job. Much lifelong learning is similar to it in that it represents learning built into the fabric of daily life. This makes it no less valuable to the learner. If more opaque, though, the job training literature would suggest that it may be equally measurable.

It may be that an important concept for collectors of data on adult education to keep in mind is *intentionally*. That is, if an individual defines an activity as lifelong learning, perhaps that is how it should be conceptualized.

Measuring training (particularly on-the-job training) is difficult enough, but assessing the extent of "personal development" courses is potentially bottomless. To define these as "structured" as NHES does helps somewhat, but ambiguity remains. Ultimately, data collection agencies need to decide such seemingly intractable issues as whether weekly private guitar lessons or Lamaze instruction or spending the weekend at Chautauqua count as adult education, and if there a sufficient social scientific and public rationale for collecting such data?[1]

2. *Think about the distinction between lifelong learning that is motivated by career or economic considerations and that which is not*

Agencies interested in the collection of data on adult education need to decide if their concern is only with educational activities with obvious linkages to the world of work or if they wish to investigate the full gamut of adult education and lifelong learning. The former category, of course, is huge. As the NHES data show, the majority of adult education participants in programs that are not directly related to their jobs still reported that their primary motivation for participating was economic (Darkenwald et al. 1998).

It is probably too much to say that the vocationalization of adult education is complete, but adult learners seem to have accepted the dominance of the human capital model as much as have many educational policy makers. If the concern is with only the economic role of schooling, of course, the data needs are probably pretty clear. Employers are quite forthright about the skills they need in their workers, and labor economists and sociologists have become quite skilled in measuring them.

It is less clear, perhaps, if the educational research community would need or want to invest in the collection of national data on job training. We already have a substantial body of nationally representative data on job training. The National Longitudinal Survey of Youth (NLSY) and the Current Population Survey alone have been the basis for volumes of research on job training, and the more recent Survey of Employer Provided Training (SEPT) probably has comparable potential. Unless substantial improvements in these data series can be offered, there is no need to replicate them.

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[1] My sense is that such rationales could be developed fairly easily. The extent of our ignorance about personal development adult education is inexcusable given the extent of our knowledge of job-related education and training.

If the concern includes education for citizenship, diversion, self-betterment, or the construction and maintenance of better family and social relationships, the needs are far more varied and challenging. Educational demographers and sociologists now have a well-developed and sophisticated technology for measuring traditional educational indicators. Consensus has long since been achieved on the measurement of such things as attainment, enrollment, and achievement. The task is to develop standards for measuring more non-traditional education. This would entail attention to such matters as survey protocols, operational definitions, question wording, and any number of such concerns.[1]

The distinction between adult education that is or is not directed at the world of work is not necessarily one that can always be sustained. A good example is the vast range of activities under the general label of Adult Basic Education (ABE). Even a brief look at the pertinent literature here shows that ABE has perhaps equal ties to the worlds of work and to broader issues of citizenship and fulfillment.[2] Similarly, the provision of English as a Second Language (ESL) programming to adults is an enormous undertaking, but again one with relevance for both the working and non-working lives of participants.[3]

3. Take the changing American lifecourse seriously

Americans move through their lives much differently than they once did. They move in and out of educational institutions, transfer readily from one provider to another, and tolerate far greater lifecourse discontinuities than would have been imagined in previous generations. Data collection on adult education needs to take this into account.

Policy-makers may or may not share the preoccupation of academic researchers with developing such sophisticated life course modeling techniques as event history analysis or hazard models, but the fact is that the timing of such events as educational reentry is often as important as the events themselves. Assessing this demands longitudinal data. As Elman and O'Rand (1998, p. 136) observed, "Most nationally representative data sets do not facilitate the investigation of midlife reentry because they do not ask respondents about the timing of schooling or training over the life course *nor* do they obtain the necessary extensive job histories."

A crucial aspect of this has to do with the effects of changing family structures on participation in adult education and training. As noted earlier, we have virtually no systematic empirical research on this. One could imagine that changes in family structure could either facilitate or hinder the ability of adults to pursue educational opportunities. Probably the most ambitious effort to measure the barriers to participation, the 1991 and 1995 administrations of the NHES, was not as well conceptualized or executed as we will eventually need.

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[1] The National Postsecondary Education Cooperative (NPEC) is pursuing various projects that should be of great value here. See http://nces.ed.gov/npec/.

[2] The National Center for the Study of Adult Learning and Literacy, funded by the Office for Educational Research and Improvement and based at Harvard University, has prepared an ambitious research agenda on ABE. They present this at http://hugse1.harvard.edu/~ncsall/.

[3] The OERI-funded National Clearinghouse for ESL Literacy Education (NCLE) has prepared a research agenda on adult ESL. See http:// www.cal.org/ncle/agenda/.

The ideal data set would be not only longitudinal, but would permit analysts to investigate the nested nature of educational participation. A fundamental characteristic of schooling is that its effects on individuals are multi-level. That is, enrollment, attainment, and the like are influenced by factors at the classroom level, the school level, and on up to the state or national level. Only in the last few years have researchers developed the statistical and computational procedures (collectively know as Hierarchical Linear Modeling, or HLM) adequate to the demands of assessing multi-level effects. Adults, like K-12 students, are subject to a range of nested influences (e.g., families, communities, community college districts, etc.). Current data do not permit the analysis of this.

4. Explore ways to link data on adult education participants and providers

As noted earlier, the linkages between individuals and educational institutions have become more tenuous as the providers of adult education have become more varied and fragmented. Still, there would be much to gain by seeking ways to link information on adult education participants with the providers of the instruction. While speaking somewhat more narrowly of job training, Osterman (1995, p. 128) observed that "It is unfortunate that the best quality nationally representative training data (e.g., the CPS and the NLSY) are on individuals and provide little information on the employer since at the heart of this recent discussion is the linkage of training with work organization."

Darkenwald et al. (1998) reported that over half (52 percent) of participants in work-related courses did so from a provider other than business and industry. A great deal of instruction came from educational institutions or professional and trade associations. This means that an enormous amount of adult education and training bearing on the demands of the workplace would be missed if training were only measured through surveys of employers. The task of collecting data on adult education can probably better be achieved with a household survey than with institutional data, but linked data, while costly and logistically difficult to gather, is certainly worth consideration.

Collecting linked individual/provider data would push an agency like NCES pretty hard. NCES has traditionally performed most effectively when analyzing traditional colleges and universities. Still, as distance technology continues to fundamentally recast the players and institutions, and as the articulation between community colleges and other training vendors becomes more elaborate, innovative approaches appropriate to these changing circumstances will need to be considered.

5. Develop standards and procedures for collecting data on distance education

Building on the previous point, the abundance of innovations and breakthroughs in distance education will require great innovations in data collection. A recent report by the National Postsecondary Education Cooperative (NPEC) has addressed this in some detail, and there is no need to repeat their serious and thoughtful recommendations here.[1] Their characterization of the problem as "how to adjust to the growth of technology-based delivery that is asynchronous and often non-site specific" (1998, p. 9) applies as forcefully to the collection of data as to proposals for developing policy pertinent to distance education. Offering more specific suggestions here is premature, but efforts to measure distance education with the same care and accuracy achieved in such series as the Common Core of Data (CCD) or the Integrated Postsecondary Education Data System (IPEDS) should be a high priority.

Conclusion

It may or may not be true that the world is changing more rapidly than it ever has. It is certainly true, though, that it is changing more rapidly than our ability to effectively monitor it. This is particularly true of the processes and trends influencing the design and delivery of adult education and training. By any estimation, lifelong learning will figure prominently in the future of the United States, not only economically but also as people construct their lives as citizens, family members, and culturally aware and competent human beings. Developing the means to track these activities should be central to the agenda of the educational research community.

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[1] At its most basic, the NPEC report gives many specific suggestions that essentially amount to a comprehensive needs analysis.

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THE HIGHER EDUCATION PROVIDER IN THE INFORMATION AGE: DATA IMPLICATIONS

by David R. Powers

EVOLUTION OF SERVICE PROVIDERS AND DELIVERY SYSTEMS AND NEEDS OF THE ADULT LEARNER

Continuing Change in Higher Education

Several major strands of change may be identified in the history of American higher education that provide a context for better understanding some of the influences shaping it today. These general trends include changes in providers, subjects addressed, students, faculty members, roles of participants, modes of delivery, definition of knowledge, and need for collaboration and cooperation.

Providers. Over the past two centuries, emphasis moved from the church to state and local government as the primary supporter of most of our higher education institutions. Recently, profit-making institutions are establishing themselves as competitors, meeting needs that existing colleges and universities are addressing inadequately or too slowly. Other organizations that are becoming prominent include corporate universities, which focus primarily on their own employees, courseware providers that are helping to train the next generation of users of their software or networks, and publishers that see niches of opportunity that can be profitably addressed. Cooperative relationships among traditional institutions and these new providers are also emerging. Meister (1998, p.186) identified four types of corporate/college partnerships as best practice examples: customized executive education programs, customized degree programs, learning partner consortia, and corporate university accreditation.

Subjects. Subjects addressed have also evolved from the early focus on training for the professions of religious leader, lawyer, and physician to study of the liberal arts, basic sciences and social sciences, and, more recently–with the advent of the Information Age–to an emphasis on technology and acquisition of skills as well as knowledge.

Students. The "traditional" college student has been evolving from the classic 18 to 25 year-old white male who studied intensively for several years on a campus and then left school with grounding in a specialty that would last a lifetime. Currently, characteristics such as time spent on campus, time devoted to intensive study versus continual learning, range of subjects explored, sex, and ethnic heritage have redefined the clientele served by higher education. The adult learner is playing a particularly important role in changing the profile of the student body. Ghazi (1997, p.14) reported that nearly 60 million adults are being educated and of these 68% were involved in work-related training. Of the 24% enrolled in postsecondary programs, only about one-third were traditional full-time students, 24% were part-time students, and 44 % were non-traditional working students.

Swirling of students in and out of different kinds of institutions and learning environments has meant that the traditional clientele expected by community colleges, four-year and specialized institutions, and even graduate schools has changed. For example, a growing number of university graduates, many with graduate degrees, are enrolled in community colleges because the content they wish to master is offered there, such as courses in particular computer applications. As much as one-fourth of the students who enroll at any given community college already have received degrees from four-year institutions. In cases in which more students start at four-year institutions and transfer to community colleges than vice-versa, the concept of one-way transfer from two-year to four-year institutions is no longer adequate.

Faculty members. Responsibilities of faculty members also are evolving, moving away from the emphasis on teaching that has been the focus of much of this century, with the faculty member lecturing and the student the passive recipient, to a model that assigns the student, singly and in groups, more responsibility in the learning process, with the faculty member serving as coordinator, coach, and mentor. Increasingly, the role of the faculty member is "unbundled," requiring the faculty member to work as a content specialist on a team that together prepares courseware that will be delivered electronically, interacts with students via e-mail and other means, and assesses outcomes. Engaging in funded research continues to be expected of faculty members at research institutions, and is valued not only on campus as integral to the university mission but by the broader society as a major source of innovation driving the economy.

Roles of participants in the educational process. Also becoming more evident in today's higher education is a blurring of the roles of student and teacher. Students who have acquired specialized knowledge, often in technology or specific job-related areas, routinely are invited to supplement background information provided by the teacher. Students work beside faculty members in university and commercial laboratories and field settings. Practitioners are made adjunct faculty members at public institutions, and corporate employees are called upon by their corporate universities to provide instruction in their areas of specialization to their fellow employees. Faculty members and other presenters continually visit the workplace and interact with departmental advisory groups to remain abreast of changes in their fields. This blurring of roles enriches the learning experience because it allows all participants, not only faculty members, to share their knowledge.

Delivery. Delivery of educational services is also changing as more sophisticated educational applications of technology become commercially available. Personal computers, television and the Internet, in particular, are allowing more and more students to study free of time and place constraints, to interact with peers of differing backgrounds, and to tap into sources of information more richly varied than are ordinarily provided by single faculty members teaching on-campus courses.

Definition of knowledge. All of these factors are having an impact on what is considered knowledge by institutions of higher education as they re-address how they will undertake their core missions of discovery, preservation, and transmission of knowledge. The once sharp dividing line between basic and applied research does not hold the power it once did in identifying the most valuable faculty members. Distinctions between education and training also are eroding, as theoretical foundations increasingly are emphasized in skills and professional development activities alike, in response to relentless pressures placed on employees to accommodate to changing assignments and responsibilities.

Collaboration and cooperation. The United States is in a period of prosperity, yet funds for higher education are limited. Reasons for this include stresses on government budgets caused by increasing numbers of aged adults requiring health care and increasing numbers of youth enrolling in public K-12 schools. These stresses have meant that less money is available for investment in the technology that is required for public colleges and universities to remain competitive. Boards of trustees, campus administrators and faculty groups–all of whom are accustomed to dealing with relatively unchanged budgets from year to year, in which net income is devoted largely to faculty salaries and building maintenance–reject internal reallocations for technology in the mistaken belief that they are protecting their campuses. In this environment, management by cooperation and collaboration with other institutions can provide ways to share expenses for existing services or even expand them, thus increasing income for the partnering institutions.

Partners are finding, for example, that dual enrollment and cross-registration of students may become a cost-effective solution when economies of scale prohibit each institution from going its own way. Containing costs by dual enrollment is particularly attractive in low enrollment fields such as specialized languages where hiring full-time faculty members is unrealistic. Arranging instruction by a neighboring institution or corporate provider can be extremely cost effective when expensive technological laboratories are required for instruction. Doctoral-granting universities routinely contract with nearby community colleges for training programs that do not justify major investments in equipment.

Many of the new providers such as courseware companies and publishers, corporate universities, and for-profit training companies also are controlling the costs of perpetual learning by sharing courses and faculties. Courses published by Novell and International Thompson are becoming ubiquitous. The University of Phoenix and other for-profit institutions frequently hire faculty members who hold tenure at nearby traditional institutions to teach live courses that lead to a credential not offered by the traditional institution and that address a different audience than the traditional institution serves. Several kinds of providers are already serving common target audiences and sharing facilities, as when traditional and for-profit institutions both offer courses in community learning centers. Customized training frequently involves a variety of providers coming to corporate training centers, having been selected by corporate training staff interested in outcomes and meeting specific employer needs. Traditional institutions are often slow to customize training to meet corporate needs, although community colleges have been more attentive to this market in the past decade.

The Information Age is characterized by rapid development of new information and transformation of how we access that information. In a changing world, educational institutions must change to continue to have value. The driver of change in higher education is student needs and expectations. It should come as no surprise, therefore, to find that the emergence of the adult learner is a significant factor in the thousands of campus change scenarios that are occurring across the country and in the emergence of hundreds of new providers. Even community colleges, which historically have been more flexible than other state-supported institutions, are under stress from new competitors, and by the need to adopt new faculty and student roles, curricula, modes of delivery, and collaborative and cooperative management approaches to respond adequately to the burgeoning adult learner population.

Value of Higher Education Continues to Increase

In the Information Age, more than ever before, higher education plays a crucial role in the economic well-being of the nation and its citizens. For good reason, economic development strategies are often focused on targeted manpower training. Porter (1990) observed that local educational, research, and other institutions that create specialized skills and technology build a competitive advantage. He recommended building strong bases of technical and scientific knowledge oriented to local clusters of industries and encouraged creation of incentives for private sector research and development and for related programs at local research universities.

Romer (1995) observed that the emerging Information Age economy is based on ideas more than objects, giving as an example the huge cost for the first copy of software or courseware and the very low cost to duplicate multiple copies. Romer also pointed out the current shift in payoff from manufacturing to the process of search and discovery. Technology is endogenous and is now a central part of the economic system. It raises returns on investment, which, in turn, increases the value of the technology. In a 1997 presentation to the Board of Trustees of the Western Governors University, Romer noted that technology raises income and standards of living while it reduces demand for traditional skills. Because education itself encourages development and adoption of new technology, it is the one policy that can make the pie bigger and divide it more equitably.

Castells (1997) defined the Information Age as being characterized by "the action of knowledge on knowledge itself as the main source of productivity" (vol. I, p.17). He also described the world of work in the Information Age. His comments are evocative because it is the job of education to prepare workers to function in this world.

Castells described modern corporations as no longer being self-contained and vertically organized. He stated: "The actual operating unit becomes the business project, enacted by a network, rather than individual companies or formal groups of companies . . . Networks are the fundamental stuff of which new organizations are and will be made." (vol. I, pp.165, 168) To this image of the modern organization, Castells added a description of the modern worker: "People increasingly organize their meaning not around what they do but on the basis of what they are, or believe they are. Meanwhile, on the other hand, global networks of instrumental exchanges selectively switch on and off individuals, groups, religions, and even countries, according to their relevance in fulfilling the goals processed in the network, in a relentless flow of strategic decisions." (vol. I, p. 3)

The individual worker of the Information Age is increasingly isolated, as the organizations with which he once identified relinquish power, including political parties, the labor movement, and other institutions of the Industrial Age (vol. II, p.362). Castells stated: "Never was labor more central to the process of value-making . . . But never were workers (regardless of their skills) more vulnerable to the organization, since they had become lean individuals, farmed out in a flexible network whose whereabouts were unknown to the network itself." (vol. I, pp.278-9) With the emergence of the virtual organization, Castells noted, "productivity and profitability were enhanced, yet labor lost institutional protection and became increasingly dependent on individual bargaining conditions in a constantly changing labor market." (vol. 1, p. 278) Minorities locked in inner cities are particularly unequipped to cope with such conditions. The creation of small businesses and resurgence of self employment and mixed employment seem, however, to be enhanced by the emergence of new flexible, networked industrial organizations that produce market niches, and by the availability of new technologies that allow small businesses to find those niches (vol. I, p. 221).

Education is crucial to the well-being of the Information Age worker, in Castells' opinion. He divides labor into "generic" versus "self-programmable" labor, and states: "The critical quality in differentiating between these two kinds of labor is education . . . Whoever is educated, in the proper organizational environment, can reprogram him/herself toward the endlessly changing tasks of the production process." (vol. III, p. 341) Generic labor is, on the other hand, described as "human terminals" and "expendable." The Industrial Age was characterized by the salarization of work and socialization of production (vol. I, p. 265). The Information Age is characterized, on the other hand, by the individualization of labor and emergence of the "jobless society."

Porter, Romer and Castells speak to different aspects of the challenge facing higher education in the Information Age, but all emphasize that knowledge is crucial to productivity. Castells, in particular, implies that education that is of maximum value imparts the flexibility, nimbleness, and adaptability that are needed for individuals to flourish in the remarkable independence of the Information Age, unsupported, in more and more cases, by vertical organizations, salaried jobs, the labor movement, and other icons of the Industrial Age.

Needs of the Adult Learner

Traditional programs. For decades, adult and continuing education programs were among the lowest status programs in the university, even while steadily bringing in income crucial to institutional development. Traditional programs directed to personal enrichment, professional updating, career changes, and desires to acquire specific skills have not lost popularity; indeed, as baby boomers age, these programs are busier than ever. What is new about current adult and continuing education programs is their sophistication, flexibility and state-of-the-art, work-skill orientation. If Castells' predictions prove true, and great increases in non-salaried workers and small, niche-market businesses occur, ever greater flexibility could be required of adult and continuing education programs, not only in terms of time, but also place and mode of delivery. Soon, courses and curricula routinely will be tailored to specific needs of individual students, depending on students' level of advancement, uses to which the information will be put, preferred mode of delivery, credential desired, and other factors.

Employer requirements. Employers need their salaried employees to learn continuously so their companies can remain competitive. They require instruction to occur in the workplace instead of on campus because they do not want lose twice by paying employees for travel hours and paying replacements to work while regular employees are gone. They also require instruction to be delivered at times of their choosing, when convenient for themselves and their employees. Efforts to meet these requirements cost effectively have led to the development of courses delivered partly through live instruction and partly through interactive technologies such as self-paced, computer-mediated learning. Employers may also require that learning be just-in-time, available when employees need to know it, not when institutions care to offer it. They want instruction to be structured for individual as well as group learning because they may need a few employees to master the material right now, not later when a class can be assembled. Dolence and Norris observed in 1995 that an average employee remaining up-to-date requires the accumulation of learning equivalent to thirty credit hours every seven years. Applying this estimate to the (then) 141 million workers in the United States revealed that every year, the equivalent of 20 million full-time equivalent students required work-related learning. Conventional higher education institutions designed to handle discrete cohorts of learners in a teaching-lecturing mode cannot hope to meet this challenge, which continues to grow.

Need for credit bank strategy. When learning is life-long, chances increase that each learner will receive a mixture of formal education in a traditional teaching setting, employer-provided instruction at the workplace, self-paced computer-mediated instruction at home and work and campus, and continuous, just-in-time learning acquired by asking questions of research databases and Internet-accessible resources on a daily basis. Swirling of students from traditional campuses to corporate training centers to personal computers in their homes to executive retreat seminars to work-site demonstrations will be routine. Because of the enormous, on-going investment of time and money in learning, chances also increase that traditional providers as well as new providers will become more outcome oriented, focusing on measuring what was learned and judging whether students should receive credentials that reflect that mastery. The need for independent organizations or institutions to recognize complex arrays of learning as they occur and to keep on-going, permanent records on behalf of individuals will be of growing importance, and moving toward competency evaluations will allow such records to be kept.

Focusing on Competency or Outcomes

Assessing competency is an old tradition in American higher education. Two centuries ago, youths would read the law, intern as clerks at law firms and take the bar exam. Using seat time to measure accomplishment–a common model being three, fifty-minute classes per week for fifteen weeks–became generally accepted in the United States during the past century, while many European programs continued to include more self-directed study, voluntary attendance at lectures, and rigorous examinations. Competency-based education requires that evidence of accomplishment be provided by an assessment strategy that may include examinations, review of a portfolio of one's work, and/or written papers and other assignments.

Employers want their employees to master specific concepts or become more competent, while students also want to earn credits and/or degrees that they can carry with them as assets when they move to their next employers. Employees also value respected paper credentials as status symbols, as assets in gaining promotions and raises, and as investments in securing future employment by enhancing adaptability and mobility. An important driver of partnerships and understandings between new providers and traditional institutions is whether competencies gained via new providers are recognized for credit transfer purposes by traditional colleges. If an institution's competency exam doesn't count toward a degree or is not credited toward part of a curriculum, it is less attractive to the customer/student.

Focusing on competency rather than on time-on-task neutralizes arguments about whether a particular course curriculum is as rigorous or complete as that of another institution by requiring students to prove mastery of the material. Competency assessment also demolishes the assumption that student preparation depends upon the completion of fixed prerequisites, because it decouples examinations from programs of study. Similarly, preparation and credentials of faculty members are decoupled from proof of student competency, a long-overdue change in a world in which an untenured faculty member with appropriate experience or a corporate employee may be more effective in helping particular students meet course objectives than a tenured faculty member presenting material from a department-approved syllabus.

In general, placing the burden of proving mastery on the student shifts the focus from teacher to learner. This challenges traditional institutions that make operating decisions, plan, evaluate, and raise funds on the assumptions that a faculty member's core role is to lecture, that faculty workload must be calculated in terms of scheduled lecture time, that priority must be given to building and maintaining facilities in which faculty members lecture, and that attendance at faculty lectures is the only acceptable prerequisite to advanced courses of study.

Effects of Instructional Technology

Emergence of new providers has been made possible by the use of technologies that allow them to invade markets that previously were closed to them. In earlier times, providers were limited to geographic areas within which students and faculty members found it feasible to travel.

Economies of scale were limited; if new branch campuses were opened to offer live lectures, unit costs might be as high as for original offerings. Large, up-front investment is also required to create effective computer-mediated software, but costs are lower per student thereafter.

Instructional technology overcomes barriers of time, place, academic calendar, and rate and mode of learning. Effects of brand name or image of credentials are alleviated as employers learn–by observing the skills and proven competencies of those who hold specialized credentials, such as the title of Novell Certified Network Engineer, for example–that more appropriate credentialing may be provided by a software company than an accredited traditional institution. Until the success stories generated by the graduates of corporate training programs became commonplace, it was not generally accepted that course content may be developed as a commercial product. Instructional technologies also can be used to train cost-effectively employees of multi-national corporations located in plants in far-flung cities or countries, easily overcoming issues of class size, workload, and classroom space.

Arguments continue to rage on campuses over the merits of mediated instruction versus traditional classroom instruction. So far, evidence has been coming in on both sides of the issue. Even the most die-hard proponents of technology do not argue, however, that it is effective in all circumstances; nor will even the most conservative faculty Luddites claim that its use is never warranted. Practically speaking, educational technology seems to be here to stay and is improving constantly. The challenge is to use it wisely in improving service delivery while protecting educational standards and continuing to rely on classroom instruction when appropriate.

To achieve all these positive outcomes, a huge, on-going investment in technology and in its upkeep and updating are required. In many programs, technology is still considered an add-on, making the costs of technology-assisted instruction appear unaffordable. To achieve cost-effectiveness in some programs, however, it is the face-to-face elements of instruction that should be considered the add-on. Many institutions will benefit by using new tools such as the BRIDGE campus cost simulation model (Jewett 1998), which provides a way of comparing the costs and benefits of mediated and classroom instruction so that optimal combinations may be chosen.

New Providers

Katz (1998, p.35) has noted, "The most formidable competitors [in the mass market for interactive multimedia] are expected to be strategic partnerships–especially between content providers and controllers of distribution channels. Among industry leaders, the key attributes for success are thought to be clear management vision, creative marketing, a risk-taking culture, and the right strategic relationships." Katz added, "Information (that is, educational) applications may be at least as important as entertainment in this evolving market."

Unfortunately, while traditional institutions of higher education remain unable or unwilling to respond adequately and quickly to these opportunities, others are doing so. Enabled by interactive technologies and driven by employers' requirements in the Information Age, remarkable growth has been stimulated in three categories: the corporate university, the virtual university, and the private professional university. Marchese (1998) produced a database of these new providers that can be accessed on the World Wide Web at *http://www.aahe.org/bulletin/bull_/May98.htm.*

The corporate university. Large employers have always trained their own employees. The advent of the computer transformed both office functions and production lines, but required a new level of continuing employee education to keep companies competitive. Corporate training grew from modest, in-house efforts to formal training contracts, to dedicated learning spaces in plants and offices, to entire campuses. In-house, corporate universities usually rely upon a variety of providers, including research universities to update executives and engineers, and community colleges to provide customized training to plant and office workers, as well as in-house resources developed to provide corporate indoctrination and orientation seminars. The culture of a corporation is well served by an in-house university, especially where coherent operation of multiple subsidiaries in many states or international expansion requires the development of a corporate culture, common vocabulary and goals, and understanding of corporate strategy throughout the organization, however geographically dispersed. Enormous state investments have been made in many of these programs by state economic development strategists to attract new industries, plants, and jobs.

Meister (1998) reported that in the last decade, the number of corporate universities grew from some 400 to more than 1,000. Among the dozens of corporate institutions described by Meister is Motorola University, which has a main campus in Schaumburg, Illinois, which enrolls about 90,000 employees every year. At this and other corporate campuses, Meister identified seven core workplace competencies that are emphasized in corporate courses: learning-to-learn skills, communication and collaboration skills, creative thinking and problem-solving skills, technological literacy, global business literacy, leadership development, and career self-management.

The virtual university. The expression "virtual university" describes an organization that provides instruction primarily through electronic technologies and other independent-study delivery systems. It usually provides an Internet-based clearinghouse of computer-mediated and video-interactive courses–from a variety of institutions or providers–which rely on e-mail for interaction with faculty members, and groupware or chat rooms for student-to-student contacts. Most virtual universities do not grant their own degrees, but enable degree-granting institutions that are members to make their programs available electronically to a broader range of students.

A well-known example of a virtual university is the Western Governors University (WGU). In 1994, at a meeting of the Western Governors Association (WGA), Governor Roy Romer of Colorado and Governor Michael Leavitt of Utah talked about the need to share courses across state lines using the new telecommunications opportunities that were then being developed. At a subsequent meeting, Governor Benjamin Nelson of Nebraska chaired a WGA session on using telecommunications to share courses throughout the Western states. In subsequent months, the idea of the Western Governors University came into being. Eventually eighteen states and territories (Alaska, Arizona, Colorado, Guam, Hawaii, Idaho, Indiana, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, Texas, Utah, Washington, Wyoming) joined this effort. By late 1998, over forty colleges and universities were listing more than 300 courses in a "Smart Catalogue" on the WGU Internet web-site. Dozens of other institutions expressed interest in using this brokering clearinghouse to promote interstate sharing of courses and, in some cases, complete degree programs, by electronically mediated instruction. In October 1998, the WGU and the Open University of the United States, a creation of the Open University of Great Britain, announced that they were joining forces to create the Governors Open University System. This cooperative effort will enable both organizations to create a staff and brokering service that will make available globally, in a mutually supportive manner, the competency-based programs of the WGU and the credit-based, independent courses of study of the Open University.

Other virtual universities are being created, the largest being the Southern Region Electronic Campus, created by the fifteen southeastern states, using a clearinghouse of over 100 Web-based courses, from 42 colleges, all of which meet best practice standards. The California Virtual University is a similar clearinghouse for California-based institutions that makes available, primarily to Californians, 700 courses from 81 public and private institutions.

The private, for-profit university. The University of Phoenix is, perhaps, the best known of the private, for-profit universities. It operates in 57 learning centers in 12 states that enroll 48,000 degree-credit students. Most of its instruction occurs face-to-face in classrooms, with courses taught by adjunct faculty members who are practicing professionals in the fields they teach. Computer-mediated programs are rapidly being added, especially in business and information technology.

The University of Phoenix is sufficiently high profile that it has alarmed many traditional institutions that historically have had little competition in their service regions. Such private, for-profit institutions are often accused of "cherry picking"; that is, of offering only high demand courses for which they can charge significant tuition, leaving the lower-enrollment but necessary fields of study to traditional providers, making them less self-sufficient. DeVry Institute of Technology now has 15 campuses enrolling 48,000 students and ITT Educational Services enrolls 25,000 students. Sylvan Learning Systems has 700 sites at which it offers tutoring, and their "prometric" testing centers are active in competency-based assessment. The growth of these institutions, all of which charge students higher tuition than publicly-supported institutions, is evidence that the traditional institutions have not been sufficiently responsive to the needs of adult, employed learners.

IMPLICATIONS FOR COLLECTING DATA ON PROVIDERS

Data Currently Being Collected on Providers

The major collectors of data on higher education providers are the federal government, state governments, and regional accreditation associations. For the most part, input data are collected, such as dollars invested and number of personnel employed and facilities owned. Some output data are also collected, such as enrollment and number of degrees granted by field.

Federal level data collection. Federal data collection and reporting systems for postsecondary education are located at the National Center for Education Statistics (NCES). The Center's best-known survey instrument is the Integrated Postsecondary Education Data System (IPEDS). This survey has a number of components, primary among them being the institutional characteristics survey by which each institution reports its offerings, its organization, accreditation, and control, the specialized accrediting bodies that have approved its programs, and its admissions requirements, calendar, tuition charges, and enrollment. Other IPEDS surveys collect information on finance, program completion, fall enrollment, salaries, tenure and fringe benefits of full-time instructional faculty, and graduate rate information.

Conducting IPEDS studies is only one of the on-going responsibilities of NCES. It has collected extensive information on the beginning postsecondary student and on the post-baccalaureate student, and conducted many other studies, including the National Household Education Survey, designed to analyze the educational activities of adults, and the National Postsecondary Student Aid Study. NCES also conducts forums on statistics, sponsors studies, and is the host of the National Postsecondary Education Cooperative, a partnership that supports policy development and implementation among providers of data.

Results of these and other federal studies are often used by state policy makers to compare their state with the 49 others on factors such as expenditures per student or average faculty salaries.

State level data collection. Each of the 50 states collects a different array of data on higher education, including information on factors such as changing enrollment, number of graduates in fields important to the economy of the state, success in meeting diversity goals, success in raising private money for distinguished professorships, evidence of development of centers of excellence, evidence of developing successful partnerships with business for economic development, improved retention rates or graduation rates of entering students, and related factors. Outcomes have been the primary concern, with an emphasis on outcomes important to meeting state needs.

About half the states use performance indicators to assess how their colleges are doing in accomplishing specific goals, such as being cost-effective and efficient, or increasing graduation rates, and about one-fourth of the states use performance data to drive budget decisions (Christal 1997). While only South Carolina is attempting to base the entire higher education appropriation process on performance indicators (32 in its case), many other states award a few percent of their budgets to institutions or programs that can demonstrate success in meeting measurable goals. Associating evidence of meeting state needs with appropriations is logical but difficult to implement in ways that actually change the behavior of institutions or make them more responsive to the needs of the people of a state. Performance-based funding too often results only in an appearance of change and improved accountability, when, in fact, only margins of activities have been affected, and institutions remain fundamentally unchanged.

Accreditation. Accreditation by regional accrediting boards is strongly influenced by participants and process. Accreditation associations are creatures of presidents of institutions in geographic regions and, as such, reflect the status quo values and cultures of those institutions and the conventional wisdom and accepted values of the higher education establishment.

Until a decade ago, data collected by accrediting associations dealt with inputs such as the number of faculty members, stability of funding available, volumes of books in the library, condition of facilities, and related elements. An accrediting team would set out to determine if an institution had clear purposes consistent with its mission, if its decision making processes and governance practices were appropriate, and if it had the human, financial, and physical resources necessary to accomplish its purposes.

Recently, however, regional accreditation bodies have been leading the way in using assessment instruments to measure outcomes. To provide evidence that its students are actually learning, an institution must use a variety of direct and indirect measures such as testing, portfolio assessments, capstone projects, and performance on licensure examinations, as well as indirect indicators such as information from alumni, employers and students, graduation rates, graduate follow-up studies, and placement data. Accreditation bodies also ask that an institution present evidence that it can continue to accomplish its purposes and strengthen its effectiveness through planning, build on assessment, meet the needs of its customers, and demonstrate integrity in its practices and relationships.

Information about the learning process and relationships among faculty and students in a setting that supports learning usually must be submitted during an accreditation review. This presents problems for non-traditional institutions that depend more on the use of instructional technology than on face-to-face interaction and/or wish to use competency and proof of learning as the primary determinant of who should receive degrees. In response to the Western Governors University's request to be considered for accreditation, a joint committee of four regional accrediting associations was created to work together to determine how to apply the above criteria in a non-traditional setting in which evidence of learning is what counts and the institution and its infrastructure are inherently virtual. The willingness of the joint committee to accommodate a collaborative effort despite its radical, transformational nature is a heartening indicator of the ability of American higher education to adapt to changing circumstances.

New Data for a New Age: Challenges and Opportunities

Underlying Concerns When Collecting Data

As needs of students change and new technologies become widely accessible, responses of provider institutions evolve. To analyze changes in providers, new data must be collected. In identifying what data to collect, at least three underlying concerns must always be kept in mind:

1. What question is being asked, what information is needed to answer it, and who should be asked to provide it? An often ignored truism is that the question asked determines both the data that are collected and the collection methodology. For example, a study of the effectiveness of higher education in meeting student goals would most likely include a question on reasons for seeking higher education, which should focus on data about student motivations for applying to college, not institutional motivations for increasing enrollment, and should be put to students, not providers.

2. Who will use the information collected and for what purposes? Utility of surveys and data depends on their users and uses. For example, similar kinds of data about tuition and borrowing may be used by the federal government to shape policies on student aid, and by state governments in appropriating funds for instruction and aid, and by managers of institutions in campus decision making. In each case, however, data will be organized in different levels of aggregation and in different sub-categories.

3. Can the information be obtained? A third truism of data collection is: Only what is measurable will be measured. For example, teachers, administrators and state policy makers all would like to know whether students learn anything of continuing value from taking particular courses, but how can reliable, quantifiable, comparable information be obtained on such a subject, even using indicators?

Challenges to the Federal Government

The federal government serves broad audiences with complex needs. If more funds were available for data gathering, more segments of American higher education could be provided with useful information; as it is, needs to be met must be selected judiciously. A key factor in making such decisions is whether the federal government is uniquely able to conduct the studies under consideration. Examples include comparative studies of public higher education among the 50 states or of traditional and new providers across the country.

Examination earlier in this paper of changes that are occurring in higher education identified several important, emerging user groups whose needs for information currently are not being met. For example, individual workers living in an increasingly jobless society not only need information about availability of educational programs, they need, as consumers, information about program enrollments and outcomes in terms of knowledge gained and career advancement to determine if investment in the programs seems worthwhile. Both traditional and new providers need to know more about each other's programs and their outcomes to determine market niches and competitive advantages, and to identify opportunities to collaborate in producing complex, expensive new programs. Employers need access to comparative information about all programs from which their employees, permanent or temporary, might benefit.

If such information is to be collected, users must be asked what it is, exactly, that they want to know. Because this is an on-going process, no survey design should be set in stone, but, instead, should be approved with the understanding that it will be updated frequently to remain capable of unearthing information that meets new as well as on-going user needs. Encouraging subjects to provide the information requested of them is another, significant challenge. Traditionally, the federal government has gathered information from institutions and students that receive federal funding. As long as student grants are awarded to students, who then can carry them to whatever institutions, public, private or proprietary, that they choose to attend, the federal government has a lever to use in encouraging the return of questionnaires and other participation in data collection efforts. Obtaining information from businesses and other employers that do not receive federal funding will be difficult, however, unless the businesses are rewarded for participating. Businesses so often are dissatisfied with the preparedness of potential employees that considerable numbers of them have become involved in local efforts to improve education. This active segment of the business community would provide information to the federal government as well, if, in return, information were made available on quality (in terms of outcomes), availability and cost of alternative educational resources available to them locally and via electronic technology. Naming them as participants in web-site presentations of study results would also recognize their efforts. More and more traditional and new providers would find it advantageous to be included in a comparative study if it gained a national reputation as a reliable consumer resource and were widely consulted by students.

Evolving Definitions of What Is To Be Measured

Undertaking studies in the current environment of change in educational providers, students, and delivery media is extremely difficult, for reasons even more fundamental than identifying cooperative sources of information. For example, new definitions of some of the most basic terms used in data collection must be developed:

- What is the definition of a student if everyone is learning all the time, everywhere, from a multitude of providers, in a multitude of settings? Is a person considered a student if he or she pays tuition to a public institution to use a computerized course module developed by a publisher–or uses during working hours a copy of the same module that has been purchased by his or her employer–or uses at home a copy of the same module that has been downloaded free from the Internet?
- What is the definition of a course, when a course module is used in each of the ways described above?
- What is the definition of a faculty member if a team of course development specialists, including programmers, media experts, content specialists, student support staff, on-line mentors, and others is needed to produce the course module described above?
- What is the definition of a provider institution if the course module were developed by an accounting firm, a publisher, a software company, a large employer, a formal university, a developer of highly technical devices, or a cooperative effort by all of these organizations?
- What is the definition of a semester, or quarter, or academic year when learning is self-paced, with no fixed starting or ending dates? What is the census date for reports, and how is student retention or progress reported?
- What is the definition of course completion if competency and what was learned are what counts, not certain numbers of contact hours over so many weeks?

Some Major New Needs for Data Collection

The following four cases involve new and important needs for information:

1. The issue of the changing state regulatory environment. Almost every state has a regulatory system whereby traditional and new providers of instruction are licensed to do business in the state and are made subject to some regulation at least at the level of consumer protection. While such regulation may be superficial for the proprietary businesses that offer short courses, it usually is much more demanding and complex for those that wish to offer degrees and/or receive state or federal student aid for their students. An institution must meet additional conditions and criteria for accreditation to keep its students eligible for federal and state aid programs. Institutions requesting state appropriations are usually subject to even more regulations governing the use of taxpayer money for facilities, new programs or new campuses.

This regulatory environment for state-owned institutions is often perceived as antithetical to allowing market forces determine the growth of institutions and where programs are offered. Even in a regulatory environment, however, students vote with their feet, choosing institutions by criteria such as cost, accessibility, programs available, parking convenience, and support services, and student activities. Except where only one public institution exists in a region, students do have an open market environment in American higher education in which they can choose among a wide variety of public and private institutions and have many program choices available from non-profit and for-profit providers. Most students are within commuting distance of a four-year college, a private college and several career or vocationally oriented, for-profit institutions. In fact, the array of choices available has led state agencies to become providers of consumer information. Similarly, accrediting bodies rely on outcomes to judge effectiveness of institutions in performing their missions.

The emergence of new providers strengthens the market orientation of postsecondary education, but should not be allowed to trigger a dismantling of current regulation of postsecondary education providers. On the contrary, it may be argued that a healthy regulatory environment creates healthy market competition and, in fact, encourages change and responsiveness. For example, the New York Stock Exchange operates in a heavily regulated environment so that a free market in investments can thrive. Participating corporations must abide by a variety of rules and report much detail about transactions or they are not allowed to participate in the market. Similarly, the rules of trading and the right to be a broker are heavily regulated.

In the same spirit, state regulation of higher education must be re-visited to ensure that regulations facilitate meeting the needs of the people of the state, that the consumer is protected, that the customer has choices, and that state institutions get public support only when they have earned it. Outstanding reports on deregulation have been produced by the National Center for Public Policy and Higher Education (Richardson et al. 1998), the National Center for Higher Education Management Systems (Jones, Ewell, and McGuinness 1998), and the State Higher Education Executive Officers (Epper 1999). It is not deregulation that facilitates a competitive, quality, higher education market, but rather constructive regulation directed to achieving planned outcomes. Regulatory powers provide a "tool kit" what allows states to influence institutional decisions and steer higher education toward meeting state needs. Incentives and subsidies can reinforce such tools. The effect of regulation should be to encourage campuses to do better.

The regulatory environment of a state can be fundamental to this effort. If a legislative mandate requires transfer of credit, or if a budget office provides a mechanism for reporting dual enrollment and sharing costs and revenues, institutions will respond. In Nebraska, the State Coordinating Commission for Postsecondary Education (CCPE) has often approved programs on condition that they be shared among several institutions, and/or offered through instructional technology so that they are available to students at institutions across the state. Similarly, the CCPE has frequently approved facilities on condition that they be used by several institutions offering different programs to people in a region. These are examples of regulation and approval used to foster desired outcomes; that is, sharing courses and facilities and using instructional technology.

2. The issue of performance assessment against a state plan. Surveys may also be of help in evaluating providers against their own plans or a statewide plan (Elliott and Powers 1997). Regulatory decisions are made in the context of a statewide plan that identifies goals the state has adopted for higher education. Goals may include having education be accessible (both geographically and in terms of cost), creating exemplary institutions, avoiding duplication of effort, ensuring efficiency and cost-effective delivery of service, and avoiding construction or hiring staff on a single campus when a coordinated effort among institutions might be a better approach.

The federal government does not articulate a national plan for higher education, given the unique federal system in the United States, but tends to express its public policy agenda in goals, such as the relative performance of U.S. students in science and mathematics compared to students in other countries. However, state government users could determine common indicators of campus achievement of the goals and aspirations of their comprehensive, statewide plans. The federal government then could survey state government higher education agencies concerning their comprehensive plans and their goals and objectives, and then ask both the agencies and the institutions to engage in a joint endeavor to assess progress against a common set of benchmarks or a menu of goals. If a state wishes to increase access for its citizens to postsecondary education, surveys could be devised to reveal needed improvements in college attendance, retention, graduation, participation by minorities, or availability of financial aid.

Similarly, patterns revealed could allow the federal government to track and encourage the use of instructional technology as an outreach delivery mechanism, permitting articulation with pubic schools. If another goal in a statewide plan is efficiency or cost effectiveness, a survey could be designed to obtain information on how dollars are spent, how facilities are utilized, or other measures of cost effectiveness. If a goal is workforce preparation and economic development, a survey could be developed that reveals information about graduate placement rates, production of graduates in fields of workforce shortages, employers' satisfaction with graduates, training partnerships or internships with employers, and performance on professional licensure examinations. Through such surveys, it is possible to link questions asked, data collected, and public policy goals in ways that are of value to state and federal policy makers.

3. The issue of providing data on sharing courses. Higher education financing is often structured by state appropriations formulas or practices that assume a traditional model of live instruction on a campus by a single institution. Absence of cost-sharing mechanisms is a fundamental barrier to sharing courses and students among institutions. Bureaucratic hurdles of reporting credit hours, receiving credit for FTE students, sharing dollars that are deposited in state accounts, and the complexities of fund transfers or paying invoices are part of the problem.

Development of reasonable and fair cost-sharing mechanisms facilitates dual enrollment and allows tuition to be shared (Matthews 1998). Provisions may stipulate that the provider institution (which pays the faculty member's salary) gets 70% of the tuition (Jones 1998), but that the receiving institutions keep 30% of the tuition paid by their own students. Receiving institutions may keep a percentage of the tuition for any students who use their facilities, such as a satellite dish, interactive video classroom, or personal computers, in completion of a course from another provider. The public policy goal is to make it profitable for institutions to cooperate and provide access to one another's courses. Information on such efforts should be sent to policy makers to use in encouraging further cooperation. The Nebraska Coordinating Commission for Postsecondary Education has used the Supplementary Budget Request Form of the Budget Office of the Nebraska Department of Administrative Services to compile information on sharing courses, programs, and space, and the use of instructional technology (Pfiel and Wagaman 1999). This information is made available to the Legislature and governor and the higher education community.

Another barrier to be overcome is sharing faculty costs. Even if one institution is the primary locus of appointment and tenure of a faculty member, contractual relationships can allow the workload of such persons to be shared through dual enrollment or shared assignments. In fact, for-profit institutions get many of their adjunct faculty members by hiring full-time staff from neighboring institutions on an overload basis. Usually these arrangements are not endorsed by or profitable for the home institution, but are entrepreneurial endeavors quietly arranged by individuals. Reporting faculty activities and shared salaries and workloads may require different surveys revealing different data.

4. The issue of data on shared programs with K-12. Collecting data on partnerships with K-12 schools is a growing need. New opportunities are developing for pre-kindergarten through post-secondary linkages designed to make more seamless the transitions from one level to another and the flow of students among institutions. In many states, adoption of high school graduation standards has led to a revision of standards for admission to college. Instructional technology has made it possible over the last two decades to offer more college courses in high schools. Creation of regional pods of high schools and colleges, usually using two-way interactive television to pipe college courses into high schools, often involving a number of smaller high schools sharing low enrollment courses such as physics, calculus, and foreign languages, has cast participating high schools in the role of facilitators of college courses. Similarly, making computer-mediated courseware available in high schools has allowed more students to earn college credits in advance for a significant part of the freshman year (perhaps without paying tuition) before graduating from high school. Reporting data on college courses delivered in high schools can be complicated if the courses offered were for dual credit at the high school and the college, particularly if the faculty member was paid by the high school, although teaching a college course. Double counting or not reporting data at all is a hazard in these provider-driven report forms.

The Nebraska Coordinating Commission for Postsecondary Education surveys higher education courses delivered in high schools to foster collaboration and develop policies concerning transfer of credit and improved articulation (Fimple and Lukesh 1997).

RECOMMENDATIONS

Measure the Learning Process

The learning process influences subsequent performance and long-term learning and mastery of skills and concepts (Ratcliff 1995), yet factors affecting the learning process are infrequently examined. In 1987, the American Association for Higher Education, the Education Commission of the States, and the Johnson Foundation issued a report entitled, "Seven Principles for Good Practice in Undergraduate Education." The principles were: student/faculty contact, cooperation among students, active learning, prompt feedback, time on task, high expectations, and diverse talents and ways of learning. This so-called "Wingspread Report" provided an institutional inventory and a faculty inventory to measure these process-oriented concerns. An effort was made to define questions to assess characteristics of institutions or faculty behavior that support the identified good practices. On the institutional inventory, institutions may evaluate a dozen qualities, such as institutional climate, academic practices, curriculum, faculty, academic and student support services, and facilities. The intent is to help institutions evaluate their educational processes. Similarly, the faculty inventory of good practice allows faculty members to evaluate their performance. On-going collection, by the federal government, of information related to good practice might focus attention on this issue and lead to improvement of campus priorities across the country.

Measure Outcomes

The most common form of outcomes assessment is performance on examinations. These are found in many professional fields such as law, accountancy, and nursing. Such qualifying examinations are quantitative, legitimized by professions, and sometimes nationally normed and criterion-referenced. Performance data from these examinations protect consumers and allow students to choose among teaching institutions. Frequently, scores are easily accessed by institutions. Other effective outcomes-assessment strategies include review of portfolios of past work, written products such as papers or articles, or results of oral examinations by neutral panels. A powerful assessment tool is evaluations by employers or supervisors and self-evaluations by recent graduates. NCES and other bodies could solicit input from all of these sources to gain understanding of the quality of outcomes. Results could lead to longitudinal studies and workshops that may influence campus practice.

Information on measuring outcomes appears in the 1994 NCES research and development report, *The National Assessment of College Student Learning*, in which Perkins, Jay, and Tishman identified six features of a framework for assessment of student learning. These included: dispositions and abilities and basic problem types; a manageable number of broad, encompassing categories; categories that work across different contexts of knowledge; dispositions defined in behavioral terms; disposition and abilities paired for structural simplicity; and greater integration of standards into dispositions, abilities and basic problem types to reflect their central role. The three principles for an assessment methodology are to use authentic assessments, to probe thinking processes–not just products–and to sample different contexts and settings of knowledge. Examples in the report suggest indicators that can be used by institutions and others to evaluate and assess performance and learning. Again, the goal is not to conduct research in support of federal regulations but to inform practice and influence campuses.

Measure All Three Dimensions of Input, Process, and Outcomes

This paper has suggested that more sophisticated understanding of user needs is required to align more closely the questions asked with data collected and instruments used. Another conclusion of this paper is that the relatively few indicators now measured are painting a very limited landscape of higher education, and that multiple indicators, taken together, would provide a better profile that would allow full value to be derived from data files.

A third conclusion is that a one-dimensional approach to the examination of higher education is not adequate to inform policy makers. Inputs are very valuable; for example, financial resources available, number of faculty members and square footage of facilities per student, percentage of faculty with doctorates, numbers of volumes in the library, and similar quantifiable inputs reveal important information on the resources available to support learning. The observation has also been made, however, that the experiences involved in the learning process itself also are important. Time on task, active involvement in learning, prompt feedback and understanding diverse ways of learning are all important to the process. Furthermore, knowledge of outcomes is essential in assessing higher education. Did a graduate learn a substantial amount in her major field of study (as assessed, perhaps, by herself, her instructors, her employer, or outside panels of evaluators)? Have graduates found employment in their fields and were placement rates and compensation competitive? Were students prepared for a lifetime of learning and a lifetime of careers marketable in the Information Age?

Not only one but all three factors–inputs, process, and outcomes–are important for gathering balanced and complete information. Coming generations of surveys and analyses should gather information that reflects all three characteristics. A three-dimensional profile will lead to more sophisticated understanding of the providers, the learners, and the education enterprise itself. There lies the means by which public policy and the federal and state agendas can be shaped effectively to improve postsecondary education. The reports will have substantial impact and influence campus behavior. This should be the NCES goal.

NCES Should Take a Leadership Role in Defining Data Requirements, Survey Design, and Database Development

The emerging importance of competency, multiple providers, continuous and perpetual learning by everyone everywhere, and the demands of the Information Age suggest subjects for future federal surveys designed to reveal demands on higher education and inform public policy decision making, including federal and state legislation.

NCES can play a crucial role in these activities by:

1. Sponsoring research. Much research has been done on evaluating the process of learning and how to assess outcomes. NCES could sponsor workshops and research programs that build on this work to identify the kinds of data that should be collected to support the federal and state missions. Such research projects might lead to development of instruments to collect data on best practices that are meaningful and use common definitions.

2. Clearinghouse and registry. NCES might consider providing support for centers that would validate assessment instruments, ensure that they are nationally normed and criterion referenced, and, perhaps, be a repository for assessment instruments. Outsourcing such centers by contracts or grants to institutions or private corporations would be preferable to creating another bureaucracy.

3. Drafting instruments. Jones and Johnstone (1998) prepared classification structures for NPEC that described learning providers and learners. NCES, perhaps through NPEC, should mobilize its survey experts to design pilot instruments to implement the classification structures, and determine who could collect and report needed information.

4. Convening panels. NCES should ask NPEC to lead in developing a national consensus on who should collect what data. The understandable tension among institutions, state agencies, and federal agencies raises issues of privacy, and questions about appropriate devolution to the states or to the institutions regarding who should have what access to what level of data. NPEC is uniquely suited to this consensus-building role, especially if it adds the many national educational associations to its panels.

5. Fund databases and reporting mechanisms. NCES should seek federal funding to set up databases that allow Internet-based access to the kinds of data that have been described herein. This paper has suggested a variety of users for many kinds of data that should be retrieved, summarized, displayed, and reported. Each user may need to recombine data to suit the questions being asked. User-friendly, on-line access to vast arrays of data will enable all parties to ask questions of the databases in ways that yield information that is useful without compromising privacy or overreaching agency authority. Users could avoid duplication of effort in defining, collecting, and manipulating data.

By providing leadership in accomplishing these five tasks, the National Center for Education Statistics would help the higher education community shape its destiny, while meeting its own statutory mandate.

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AN ANALYSIS OF FOUR WORKPLACE TRENDS AND THEIR IMPLICATIONS FOR DATA COLLECTION

By Bonalyn J. Nelsen

As economies long based on the production of goods give way to those based on the provision of services, the production of knowledge, and the management of information, productivity and profits will increasingly flow from human rather than material capital. This implies that continued investments in the education and training of the American workforce will be vital to sustaining the economic growth and social welfare of industrialized nations. However, questions surrounding the subject of worker education abound. For instance, how are factors such as technological innovation, new employment relations, corporate investments in learning, and the rise of a service-based economy changing the nature of work? What impact are these factors having on the educational needs of the American workforce? How complete is existing data on work and worker education? And what types of data are needed to more fully understand and adapt to ongoing changes in the workplace?

This paper will address these questions by examining the implications of current workplace trends for adult education and training. Specifically, four trends are investigated: the impact of computerized technology on work skills; the redefinition of post-war labor-management relations; increased interest in organizational learning; and the rise of a service-based economy. The first section of the paper will provide a brief overview of these trends and their implications for adult education. These essays draw on the best current data available to explore the challenges and issues thus raised. Care is taken to highlight questions raised by these issues as well as questions answered. The paper will conclude with general recommendations regarding future research on worker education.

At the outset, it should be noted that any attempt to document "the" workforce or its educational needs reflects a certain amount of hubris. There were, after all, over 120 million adults employed in the U.S. at the end of 1990, organized in a division of labor of staggering complexity (Bills 1995). The American workforce has been assailed by numerous socioeconomic forces in recent decades, including deregulation, the globalization of markets, regionalism, technological innovation, political turbulence, the growing influence of large organizations, job insecurity, and shifts among major economic sectors. Meanwhile, the workforce itself has grown increasingly diverse, reflecting an almost unprecedented mix of gender, race, ethnicity, abilities, and attributes. Clearly, the task of capturing such diversity is beyond the scope of any text. However, a single text can bring some perspective to this diversity. That is the goal of this paper.

FOUR WORKPLACE TRENDS AND THEIR IMPLICATIONS FOR ADULT EDUCATION

Technological Change in the Workplace

In recent years, few topics have generated more interest and concern than the relationship between technology[1] and work. Industrialized societies are currently experiencing a shift in their technological infrastructure—the small set of core technologies on which derivative production processes are based (Barley 1994; Barley and Nelsen 1995). Processes that once relied on technologies such as the electric motor, the telephone, and the internal combustion engine are being transformed by microelectronic and computerized technologies ("microelectronics" hereafter). Because microelectronics are the basis on which other production processes are founded, these technologies have quickly diffused throughout most, if not all, productive sectors of the economy. Few work domains remain untouched by the influence of technological innovation.

Microelectronics can alter work skills in two basic ways. First, microelectronics can be used to *automate*, or *downskill*, work. In automated work systems, management attempts to increase efficiency and control over work processes by fragmenting tasks and appropriating workers' skills, particularly skills involving the conception, planning, and control of production. Workers are systematically stripped of work skills and task discretion, which are subsequently embedded in "smart" production technologies, regimented work practices, and organizational structures and policies (Braverman 1974). As tasks are increasingly fragmented and worker discretion diminished, production jobs require fewer complex skills and responsibility: conception and execution of tasks become separate, with management, professionals and technical specialists claiming the former and production workers executing the latter. Widespread downskilling results in an average decrease in workforce skills and eventually polarizes the workforce by creating a majority of low-wage, low-skill jobs which are controlled by a small, elite corps of managers and technical experts (Braverman 1974; Kraft 1977; Shaiken 1984; Burris 1993).

Alternately, microelectronics can be used to *informate*, or *upskill*, work (Zuboff 1988). In informated work systems, management attempts to increase productivity and efficiency by expanding the responsibilities and skills of workers, particularly skills related to problem solving, decision making, and monitoring production functions. Because workers assume many of the tasks and responsibilities formerly performed by supervisors, and because microelectronic technologies allow a handful of workers to do the jobs of many, firms are able to streamline production processes and employ fewer workers overall. Remaining jobs generally require a broader variety of complex, high-order skills in addition to the practical "know-how" (Ryle 1954) acquired on the job (Crossman 1960; Blauner 1967; Hirschorn 1984; Zuboff 1988). Although upskilling results in an average increase in skills among workers employed in informated work systems, its overall effect on the labor force is indeterminate. The fates of displaced workers hinges on the availability of high-skill, high-wage jobs and their ability to acquire them.

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[1] Technology is broadly defined as "people, resources, and machines, harnessed in a sociotechnical system of manufacture to produce goods and services more efficiently" (Lewis 1992, p.16). This definition is felicitous because it avoids the common tendency to equate "technology" with machinery, devices, objects, or other "hard" forms of technology. In line with sociotechnical theory, technology is more properly conceived as the social dynamics, organizational practices, techniques, and resources that comprise a production system (Burns and Stalker 1961).

As Spenner (1995, p. 34) noted, "the economy of a society contains an overall skill level in any point in time that reflects both the mixture of jobs and the distribution of people to jobs." Thus, technological innovation can transform the level of workforce skill in basic two ways. First, as discussed above, the skill content of jobs in specific occupations, industries, and economic sectors can experience downskilling, upskilling, or both. Second, widespread downskilling and upskilling can produce compositional changes in the workforce by either increasing or decreasing the number of skilled jobs available. Although interrelated, these dynamics are not isomorphic; the impact of technology on job content and job composition can vary and, potentially, cancel one another out (Spenner 1995).

Since the early 1970s, the prevalence and inevitability of downskilling and upskilling have been hotly debated topics, and virtually dozens of studies have documented the impact of microelectronics on work skill. Table 1 summarizes the findings of a representative sample of case studies, which provide a fairly detailed picture of skill changes in specific occupations, industries, or firms. These studies suggest that the outcomes of technological change for any particular occupation or industry are variable and uncertain. Case studies in particular show that upskilling, downskilling, or, more commonly, a mixture of upskilling and downskilling can be induced by a particular technology, or be manifest in a single organization. For example, Kelley's (1986) study of the impact of numerically controlled machine tools on 41 occupations documented highly variable effects across the firms and countries studied. Although several studies reported decisive downskilling (Kraft 1977; Wallace and Kalleberg 1982) or upskilling (Hull, Friedman and Rogers 1982; Adler 1992), the bulk of studies cited reported mixed effects, often with some evidence of skill polarization among workers.

The findings of the aggregate studies summarized in Table 2 are more conclusive. These studies assess the net effects of upskilling and downskilling by averaging skill changes across occupations and industries, looking for changes in the overall level of workforce skills. Taken collectively, the specific occupations, industries and/or economic sectors indicate that the workforce as a whole is experiencing modest upskilling. This is hardly surprising given that the number of professional and technical workers increased 282 percent between 1950 and 1988 (Silvestri and Lucasiewicz 1989). Indeed, forecasts indicate that these occupational sectors will represent the largest sector of the labor force (18-20 percent) by 2000 (Silvestri and Lucasiewicz 1989; Bishop and Carter 1991).

However, given that several studies (Spenner 1979, 1982; Karasek, Schwartz and Pieper 1982) found little or no net changes in skill level, predictions regarding future demands for complex skills should remain cautious.

Perhaps the best conclusion that can be drawn from this evidence is that outcomes of technological innovation for any particular occupation, industry, or firm are uncertain (Spenner 1995). Upskilling, downskilling, or both may result when microelectronics are introduced in the workplace. Their unpredictable nature suggests that outcomes of technological change are mediated by intervening forces such as occupational culture, unionization, and managerial discretion (see Zuboff 1988; Spenner 1995; Texeira and Mishel 1995). Aggregate studies indicate that the average skill requirements of jobs are inching upward, albeit at a very gradual pace. This suggests that jobs of the future will indeed require additional, different, or more complex skills, although exactly when and where such skills will be required is unpredictable.

Upskilling and the Technization of Work

While few clear patterns emerge from these data, one does present itself: workers in a variety of occupations are experiencing at least some upskilling as a result of technological innovation. When work is upskilled, workers experience the dynamics of technization. Technization occurs when computational technology and/or technical skills and knowledge are infused into of existing lines of work, thereby transforming the practices traditionally used to accomplish tasks (Barley and Nelsen 1995). This process is not usually obvious because it does not change what an occupation is called and because practitioners appear to outsiders to be doing what they have always done, even though they now do it in dramatically ways. Although it is difficult to gauge the extent to which qualitative changes are occurring in the nature of work, mounting evidence indicates that such change may be widespread.[1] For example, technization has been documented in fields as diverse as automotive repair (Nelsen 1998), banking (Adler 1992), farming (Bahls 1989; Price 1993; Smith 1984), machine repair and maintenance (Bailey 1989), machining (Bright 1958, 1966; Buroway 1979; Kelley 1986), mill operations (Zuboff 1988), and printing (Hull, Friedman, and Rogers 1982; Cockburn 1983).

Technization does not change what people do, but rather how they do it. When technization occurs, workers begin to perform old tasks in radically new ways using new types of skills. Blue-collar workers have traditionally drawn on contextual skills and knowledge to perform tasks. "Contextual knowledge" refers to situationally embedded understandings of materials, instruments, tools, social settings, and techniques that arise out of hands-on experience. This knowledge consists of at least five types of understanding.

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[1] It is difficult to estimate the extent of technization because aggregate occupational data does not document this shift. Compositional studies are based on job titles; at best, they index broad changes in what people do. But they remain largely insensitive to changes in how people do what they do unless shifts in technique also lead to changes in occupational nomenclature. Aggregate occupational data, therefore, are generally blind to changes in the way work is performed.

Semiotic Knowledge. Semiotic knowledge is the ability to interpret the relevance of colors, shapes, patterns, sounds, smells, and other sensory cues in the course of work, either directly or with the aid of instruments and procedures that produce or amplify cues. For instance, prior to technization, the pulp paper mill operators studied by Zuboff (1988) regularly touched and smelled wood pulp to discern its quality and readiness for pressing. And, because the difference between perfectly cooked and overdone steaks is minute, vigilant cooks are highly attuned to the smell, color, and texture of meat as it broils (Fine 1996). As these examples suggest, the ability to interpret semiotic cues is useful for two reasons. First, by becoming familiar with the sensory cues associated with changes throughout the production process (or their part of it), workers can make critical assessments about the quality or readiness of a product in various stages of production. Second, the ability to interpret sensory cues denotative of trouble helps workers avoid problems as well as diagnose problems after they have occurred.

Sensorimotor Dexterity. Sensorimotor dexterity—or "having a feel" for instruments, materials, and techniques—is crucial for successful practice in many work domains. Although the idiom is at times synonymous with simple familiarity, in most instances the phrase refers to tactile skills or what Harper (1987) has called "ways of the hand." Through the course of repeated practice, practitioners develop an innate sense of proper manipulation of tools and materials. For instance, through repeated experience, mechanics learn how properly tightened filters and bolts should feel when seated (Nelsen 1996), and maintenance mechanics appraise the strength and quality of a welded joint simply by brushing it with their fingertips (Harper 1987). Such knowledge is embedded in the body unconsciously, in response to physical, sensory cues encountered in the context of practice.

Heuristics. Heuristics are rules of thumb derived from a combination of past experience, tacit understandings of procedure, and formal knowledge. These rules do not dictate what tasks should be done (this is the role of protocols and standard operating procedures) but rather offer general knowledge about particular instruments, materials, or steps in a procedure. They are rarely written down; instead, heuristics are circulated among workers as stories or snippets of advice. For instance, the machine operators studied by Kusterer (1974) were quite familiar with the eccentricities of their paper-rolling machines, and used this knowledge almost daily to improve the machine's performance and avoid breakdowns. All workers on a shift would know of machines that were particularly slow or troublesome, and would offer advice on how to avoid problems. "Tricks of the trade" such as this often make the difference between successful and unsuccessful performance on the job.

Adherence to a Work Style. Adherence to a work style entails adopting a characteristic style of practice deemed crucial for avoiding the type of mistakes that occur in a particular work context. Because it is tied to the context in which workers toil, work style can vary considerably across occupations. For example, the dangerous and risky circumstances surrounding their work makes trust among ironworkers paramount. Ironworkers are expected to move along steel beams and scale dizzying heights in a confident and thoughtful manner in order to prevent injury to and inspire confidence among co-workers (Haas 1972). Similarly, locomotive firemen, brakemen, and switchmen perform their tasks in a manner that demonstrates an almost obsessive concern for operational safety and accountability (Gamst 1989). As these examples suggest, dedicated adherence to a work style is a central component in workers' proactive strategies for avoiding trouble, both real and imagined.

Social Skills. Social skills, or the ability to make out and adapt to the social and cultural norms present in work contexts, are an important but frequently overlooked component of contextual knowledge. All social groups possess a set of cultural rules and norms that guide the behavior of members. Persons who aspire to membership must learn to identify and comply with these rules (Gerholm 1990). Social skills are the skills required to evaluate and respond to situational demands in social settings. They provide individuals with the ability to "fit in" or gain acceptance in social groups by appreciating the cultural rules and norms governing any given situation and adapting their behavior to comply with those rules. This ability is critical because individuals who experience difficulty in perceiving and adapting to cultural rules risk being labeled an "outsider". As a rule, those who hold this marginal status receive fewer benefits. In work groups, benefits consist of favors, indulgence, offers of assistance and, perhaps most importantly, access to the informal knowledge required for practice.

Taken collectively, semiotic interpretation, sensorimotor dexterity, mastery of heuristics, adherence to a workstyle, and social skills comprise the contextual skills and knowledge traditionally plied by persons engaged in manual work. These skills, gained informally through experiential learning on the job, proved adequate for most blue collar jobs, and for unskilled and semi-skilled jobs in particular. But these skills are insufficient for lines of work experiencing technization. Generally speaking, upskilling restructures manual, blue-collar jobs in a fairly predictable way: work becomes cleaner, more conceptual, less physical. The precise nature of changes in job content and skill requirements vary by occupation, but the following changes are commonplace.

Generation and Interpretation of Symbols and Texts. In traditional blue-collar contexts, workers perceive and experience work directly through close physical contact with materials and processes. Through sustained contact with physical systems, workers learn to make out and interpret sensory cues that provide needed information. With computerization, however, the work process is transformed. Unlike biological, mechanical, hydraulic, or electro-mechanical systems, microelectronic systems provide very few sensory cues; typically they are silent, odorless, still, opaque, and unchanging. Instead, these technologies produce an array of symbolic or textual cues: shapes, numbers, letters, codes, and the like. Because microelectronic technologies mediate the interface between workers and physical systems in a computerized workplace, the physical relationship between worker and work becomes tenuous. Workers must increasingly look to the symbolic, schematic, and textual cues generated by microelectronic technologies for information about production systems. For example, to monitor and adjust the self-contained, automated controls utilized in continuous process factories and mills, operators must become adept at scanning and interpreting the data flashed on computer screens (Zuboff 1988). Machinists must anticipate the actions of numerically controlled machine tools by scanning and amending the programs that guide them (Inman 1992). And automotive repair technicians must retrieve and decipher digital "trouble codes" from automotive computers to pinpoint engine problems (Nelsen 1996). As these examples suggest, the ability to interpret symbolic cues allows workers to recognize that something out of the ordinary either has occurred or might occur. Hence, this skill is a critical component of diagnosis and problem solving in computerized work systems.

Comprehensive Understanding of Work Systems. Throughout the early and middle decades of the twentieth century, U.S. businesses rose to power based on "robust" production systems (Thomas and Kochan 1990) in which work was fragmented and highly controlled (Berryman and Bailey 1992). Workers performed discrete, non-overlapping functions that entailed little responsibility for decision making or problem solving. Because their tasks were circumscribed, workers' knowledge of production systems and their role within them was rather limited. But when technization occurs, production roles often become expanded. Computerized technologies generate and distribute great quantities of information about the productive and administrative systems underpinning production systems (Zuboff 1988). Such data—if shared—allows skilled production workers to perform tasks and make decisions that were formerly reserved for more costly employees—managers, professionals, and other specialists. It is not unusual to find workers engaged in planning, creative thinking, quality control, problem solving, and decision making in computerized work environments (Berryman and Bailey 1992). For instance, the jobs of mid-level banks clerks have evolved from "order-taking"—basically, filling out forms—to providing customers with information and advice needed for purchase decisions (Berryman and Bailey 1992). To perform such tasks effectively workers must possess a broader understanding of work contexts and their role within these contexts. Detailed information about products, performance, customers, the roles of line and support functions, and organizational goals is needed to effectively perform expanded work roles.

From Habitual to Intelligent Practice. In traditional, "robust" production systems, production workers were expected to execute tasks—and little else. Responsibility for planning, monitoring, and controlling production systems fell to management and professional staff. Consequently, workers were shown how to do things but given little understanding of why it was important to perform tasks in a particular way or why materials and processes behaved the way they did. The result was what Ryle (1954) has called "habitual practice": practice uninformed by a deeper, more conceptual understanding of work processes. Once mastered, tasks are performed unthinkingly and automatically; the ability to consider alternative methods, exercise vigilance, or engage in self-criticism is limited. When one practices habitually, any given performance is a replica of its predecessors. Habitual practice is adequate so long as workers are not required to exercise critical judgment or adapt their skills to shifting or unfamiliar conditions. When workers engage in decision making and problem solving or cope with new products and tasks, the ability to practice intelligently is required. According to Ryle (1954), "intelligent practice" demonstrates conscious reflection on action: practitioners consider their actions prior to execution, strive to economize their efforts, act with skill and judgment, and use feedback to modify subsequent performances.

In upskilled work environments, change occurs at an accelerated pace. Technological innovation, expanded work roles, new skills and knowledge, and new patterns of organization challenge workers to continually adapt their skills and practice. Hence, the ability to practice intelligently is highly valued. To do so, workers must comprehend the rules and principles underpinning products, services, and work systems. A more abstract or conceptual understanding of what they are doing allows workers to perform tasks they have not done before, and solve problems they have not previously encountered (Berryman and Bailey 1992). The aforementioned bank clerks, for instance, must understand how various financial products and services work and how they will potentially affect each customer's portfolio. Absent such knowledge, clerks are unable to offer sound advice to clients seeking their direction.

Capacity for Self-Directed Action. As noted above, production roles in technicized work environments often expand to encompass tasks formerly performed by supervisors and professionals—planning, monitoring, controlling, and the like. Such workers typically work in loosely supervised environments; workers themselves are responsible for directing their actions. Empowerment requires a capacity for self-directed behavior: workers must demonstrate an ability to prioritize tasks; gather, organize, and interpret information; and interact effectively with others (Berryman and Bailey 1992). To the extent that tasks are unstructured, workers must communicate effectively and coordinate their actions with others, engage in negotiation, and resolve conflicts. For example, operators responsible for monitoring and adjusting continuous process controls in a chemical plant require communication, the ability to prioritize, and organizational skills to carry out their relatively unstructured tasks (Blauner 1967).

In sum, when computational technologies infuse blue-collar work, the content of jobs can be radically restructured. Conceptual skills—the ability to generate and interpret symbols and texts, comprehensive understanding of work processes, intelligent practice and abstract reasoning, a capacity for self-directed action—modify and occasionally supplant contextual skills in the context of practice. Some of the knowledge used to perform technical tasks is conceptual, and is encoded in the form of software, protocols, textbooks, manuals, schematics, and programs. But the bulk of information used in everyday problem solving is contextual, consisting of bits of experiential, and often tacit, knowledge centered about the particulars of practice. This may include semiotic knowledge (the ability to interpret physical signs and codes), sensorimotor skills, heuristics or rules of thumb, adherence to a particular workstyle, and the ability to interact with others and access needed knowledge, both formal and contextual (Barley and Nelsen 1995). Contextual expertise is often critical to the successful performance of work (Barley and Bechky 1994). However, because it is rarely written down, such knowledge is acquired only through practice and participation in a local community of practice (Nelsen 1997). Because of the highly contextual nature of practical knowledge, it is not unusual for blue-collar technicians to possess a much fuller, more detailed understanding of their work than the managers who supervise them or the consumers who patronize them (Barley and Bechky 1994; Barley and Nelsen 1995; Nelsen 1996). Because they do not possess the knowledge needed to successfully complete tasks and solve problems, supervisors and consumers are dependent upon technicians and their expertise (Barley 1994).

The extent of this transformation varies by occupation and/or organization. A few studies have documented extreme cases of technization, wherein existing lines of blue-collar work are stripped of their contextual content. Prior to technization, the print compositors studied by Cockburn (1983) set type for newspapers manually using cold linotype technology. This was extremely physical work—compositors required sensorimotor dexterity, semiotic skills, adherence to a workstyle, a tolerance for noise and grime, and physical strength. But the advent of photocomposition—setting type electronically on a computer—made these hard-won skills redundant. With the exception of keyboarding skills, the skills required for photocomposition were largely conceptual. Zuboff (1988) describes similar outcomes in her study of operators in pulp paper mills, where the introduction of remote electronic monitoring systems made physical and sensory monitoring of production processes unnecessary. In extreme cases of technization, work loses much of its physical nature, becoming cleaner, less taxing, and more abstract. Consequently, conceptual skills become paramount in job performance.

But extreme cases of technization appear to be the exception rather than the rule. More often, computational technologies mediate some, but not all, aspects of the physical interface between work and worker. Because their work revolves around computational and non-computational technologies and processes, workers employ both contextual and conceptual skills to perform tasks. When confronted with diagnosing an engine problem, automotive technicians initially engaged in what might be called "purposeful groping"—running fingertips along vacuum hoses and tugging lightly at wires and connectors—to eliminate simple sources of mechanical and electrical failure before turning to complex diagnostic procedures such as voltage drop tests and scanning technical schematics (Nelsen 1994). Mechanics responsible for maintaining and repairing computerized weaving equipment require a practical knowledge of tool use and metallurgy as well manuals, diagrams, and technical bulletins supplied by the manufacturer (Bailey 1989). And, because even minute changes in tone and pitch betray movement at the contact point between raw materials and cutting surfaces, machinists must be equally adept at interpreting the variations in sound produced by their numerically controlled machine tools and deciphering the programs that guide them (Inman 1992). In short, technization tends to produce work that is, at once, contextual and conceptual, practical and learned, material and symbolic. It is this melding of opposites that distinguishes technicized work from traditional forms of blue-collar work.

Implications of Technization for Adult Education

Although questions remain about the average skill requirements of jobs in the U.S. economy, it is clear that workers in many work domains are contending with new job requirements and organizational roles. Technization can radically restructure the nature of blue-collar work, making it akin to technical work—jobs become cleaner, more conceptual, less physical, more abstract. Because production-level workers often lack the conceptual skills demanded by such jobs, upgrading is needed in instances of technization. This entails not only improving the overall quantity and quality of education, but also changing the content of worker education (Berryman and Bailey 1992). Workers increasingly need the types of skills and abilities traditionally associated with formal schooling—the ability to read and interpret symbols, texts, and mathematical formulae, to engage in abstract reasoning, to take measurements and perform calculations, and so on. Moreover, expanded work roles and the shifting, unstructured nature of tasks demand the types of organizational and social competencies long associated with white-collar jobs. Acquiring conceptual competencies will be key to maintaining or improving the living standards of workers, for deficits of conceptual skills effectively disqualify them from high wage, high skill technical jobs. This suggests that education and retraining will be a continuing concern for the rank and file and the institutions responsible for educating them.

Upgrading the work skills of front-line workers requires more than providing more or better education, however. Educators must also contend with three factors that interfere with retraining. The first is a general lack of scholarly aptitude or desire occasionally witnessed among workers experiencing technization—even the most effective, up-to-date training programs and pedagogical practices will not help workers who are unable or unwilling to participate. Second, educators must contend with styles of learning that frustrate efforts to inculcate conceptual skills and learning in formal educational environments. Finally, educators and others must confront and overcome the mind/body duality inherent in teaching institutions. Each of these challenges will be considered in turn.

Deficits of Ability or Will. Studies of technization indicate that some workers invariably fail to make the transition to technical work roles, even when training is provided. For some, the difficulty is rooted in a lack of basic skills. For instance, Bailey (1989) reports that many of the mechanics he observed quickly fell behind in training sessions designed to teach them how to repair computerized weaving equipment. It was discovered that an inability to perform basic mathematical calculations, use a calculator, or determine acceptable tolerances for machine parts confounded students' efforts to learn more advanced material (Bailey 1989). Similarly, an inability to speak or read English thwarted students' efforts to become automotive repair technicians because, in the United States, nearly all training materials, certification exams, technical manuals, and other sources of repair data are printed exclusively in English (Nelsen 1996). In such cases, remedial training in basic skills often proves useful. Bailey's mechanics, for example, benefited from a "pre-fixer training course" designed to tutor them in the basic skills needed in loom repair. And while automotive repair schools were not in the business of teaching English, several programs studied by Nelsen did offer remedial training in reading, measurement, and basic mathematics.

A lack of desire to retrain can also block efforts to upgrade worker skills. Some workers confronted by the prospect retraining simply choose to acquire less skilled, lower paying jobs created by technization or to exit the occupation entirely. For example, Zuboff (1988) reports that some older, highly experienced workers in the pulp paper mills she studied chose to quite their jobs rather than participate in retraining, much to the surprise and consternation of their co-workers. Although very little research has examined why or how workers make this choice, several factors appear to be involved. Because computational technologies can render formerly robust contextual skills insufficient for practice, technization undercuts the sense of mastery built up over years of experience. For some individuals, this is a humbling experience that cannot be borne. Others are wary of formal retraining, particularly when such training has been infrequently offered or they have been long absent from the classroom. Still others nearing retirement may simply choose to exit rather than retrain, particularly if separation incentives are offered. Acquiring a deeper and more comprehensive understanding of issues surrounding decisions to upgrade skills would shed considerable light on this topic.

Technization and Styles of Learning. Technization's challenges do not end once students are coaxed inside a classroom or training program. The styles of learning predominant among front-line workers can impair classroom performance and thus prevent trainees from acquiring needed skills. A "style of learning" is a set of habits, attitudes, and preferences that pertain to the act of learning (Hall 1959). A style of learning directly determines not what information is acquired, but rather how information is acquired. Nevertheless, because what one learns is partly a function of how one learns, styles of learning have an important, if indirect, relationship to the outcomes of education and training.

Throughout history, two styles of learning have been predominant. The first is informal; it consists of an orientation toward hands-on, contextual learning, learning through observation and imitation, intuitive understandings of formal concepts and theories, suspicion of formal authority and credentials, and a preference toward practical information and subjects (see LeMasters 1975; Willis 1977; Heath 1983). The second style of learning is formal. This learning style consists of decontextualized learning; didactic learning; explicit understandings of concepts and theories; acceptance and approval of formal authority and credentials; and orientation toward abstract, conceptual information (Heath 1983). Respectively speaking, these styles were consistent with, and appropriate for, lives devoted to manual and mental work. But neither style meets the needs and demands of technical work. Technical work is, at once, mental and manual. Because both elements are necessary for the successful performance of technical work roles, styles of learning oriented toward mental or manual work provide inadequate preparation for technical jobs. Becoming technical, then, requires more than acquiring the right kind of skills. Trainees must also learn to learn in new and different ways. Unfortunately, acquiring a new style of learning is no simple task.

In Western societies, the way one learns to learn is largely a function of social class. Working-class youth have acquired informal styles of learning, whereas middle-class youth have adopted formal styles. Almost from birth, children learn to learn either in an informal or formal style. Parents, neighbors, siblings, and other adult figures instill ideas about how one should learn from an early age. By the time a child enters school, a style of learning has firmly taken root (Heath 1983). Styles of learning are subsequently reinforced in the classroom by placement in vocational and academic tracks, interaction with teachers, and channeling extracurricular interests. Styles of learning shored up in school are reflected in, and reinforced by, training practices in the workplace.

Styles of learning have been passed from generation to generation through this cyclic pattern of socialization. Over time, learning has become embedded in, and deeply reflective of, class culture. One's style of learning is, at once, an expression and affirmation of social identity. As such, styles of learning assume a normative character; there is a felt sense of "rightness" about them which makes styles of learning highly resistant to questioning and change. And yet, change must occur if trainees are to develop the skills and identity needed for technical work roles. Becoming technical therefore poses something of a dilemma for retraining workers: they can retain their style of learning, a path which may block them from acquiring needed skills and better jobs, or they can adopt a more catholic style of learning at the price of questioning and ultimately rejecting ideas that have defined their sense of self.

This paradoxical situation was commonplace in automotive repair training programs observed by the author. In accordance with the increasingly technical nature of automotive repair, programs were structured to teach both mental and manual skills. Students spent approximately half of their time in classrooms learning the conceptual underpinnings of repair work, with the other half devoted to practical, hands-on application of concepts in a shop environment. Although the balance of skills and pedagogical practices seemed optimal, most students struggled in this learning environment. The bulk of the students enrolled had blue-collar backgrounds; these students generally exhibited informal styles of learning. These students excelled in the active, practical environment of the shop, where they could learn in context using familiar tools and methods. But informal learners became withdrawn, passive, or disruptive in the classroom, behaving in a manner reminiscent of their high school days. In contrast, a small minority of students, who usually had backgrounds in white-collar jobs, demonstrated formal styles of learning. These individuals studied hard and were fully engaged in classroom activities, but shrank from assignments in shop classes. Formal learners were hesitant to get dirty, were fearful of making mistakes or showing ignorance, and were indignant at being shown up—in this setting, at least—by informal learners. The upshot was that many formal and informal learners failed to acquire the contextual and conceptual skilled needed for technical practice.[1]

Nevertheless, the fact that workers upgrade their skills suggests that people can and do navigate the horns of this dilemma. Despite the difficulties involved, some trainees manage to transcend old allegiances and biases to develop the skills and identity necessary to become technical. This was indeed the case in the aforementioned training programs. A handful of students were equally adept at learning in classroom and shop environments. Their accomplishment prompts some important and, as yet, largely unanswered questions. For instance, how do styles of learning shape pedagogical preferences? Why do some trainees acquire a new style of learning while others do not? What factors influence the likelihood of acquiring a new style of learning? And what, if anything, can be done to facilitate the acquisition of new styles of learning? The answers to these questions will make a key contribution to ensuring the educational preparedness of the workforce.

Technization and the Mind/Body Duality. The need for opportunities to upgrade worker skills through continued education and training will be important and ongoing. But the usual remedies offered for the so-called "skills crisis", namely, education and training, will not resolve the problem, for the effects of technization extend beyond changes in the skill content of work. Technization challenges cultural schemes used to distribute status and privilege, in the workplace and in society at large, by bridging the gap between "mental" and "manual" work. Barley (1994) explains this distinction thusly:

> Western images have long rested on a set of dichotomies: mental/manual, clean/dirty, educated/uneducated, white-collar/blue-collar, exempt/non-exempt, manager/worker, and so on. The first and last term of each dichotomy anchors respectively the upper and lower end of a system of status or prestige. Moreover, the concepts that define higher and lower status cluster, at least linguistically. For instance, we typically conceive of manual work as dirty work performed by poorly-educated workers for an hourly wage. Such "orderly" conceptual clustering has shaped Western evaluations of work since the industrial revolution..." (p. 27)

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[1] This does not imply that students were incapable of overcoming styles of learning inimical to technical practice. Indeed, the very presence of technicians in the workplace attests to the fact that people can, and do, overcome learning biases. In the programs observed, however, only a minority of students were able to transcend deeply ingrained habits. Several factors contributed to their achievement. First, unlike "non-achievers," these students had the support of family and friends; they were fully aware of the economic consequences of not transcending old styles of learning; and they possessed a desire and ability to learn.

Traditionally, blue-collar occupations have conformed closely to cultural expectations. Unskilled and semi-skilled operators, service providers, and laborers were archetypal manual workers—their work was dirty, taxing, and physical. Moreover, these jobs usually required little or no formal education or training beyond high school (if that), and paid an hourly wage. Even craftspeople did not pose a threat to this classification as, despite their considerable skill and training, craft work was physical and dirty (Barley 1994). White-collar occupations also maintained the alignment of cultural dichotomies. Without exception, executives and professionals perform clean, conceptual tasks that require extensive formal education, while clericals view themselves as "staff" in spite of limited chances for promotion, limited formal education beyond high school, and hourly status.

In contrast, technical work does not conform to this expectation. Such work requires a combination of skills that have been considered culturally distinct. For example, technicians manipulate symbols and text as well as tools; craft ideas and hypotheses as well as objects; produce reports as well as goods and services. In short, technical work is symbolic *and* practical, contextual *and* conceptual, mental *and* manual, clean *and* dirty (see Barley 1994). The tendency to collapse and combine cultural categories is reflected throughout this work. For instance, workers may engage in abstract reasoning, monitor processes and take measurements, and use sophisticated tools and instruments, but most jobs require no credentials or post-secondary education (see Whalley 1986). Blue-collar technicians typically hold subordinate positions in the organizations that employ them and, although a few may be extended autonomy by their supervisors, the technician's work is often subject to strict control and supervision (Nelsen 1996; Orr 1991). And although a few technicians may be well paid, most earn meager wages despite their expertise (Nelsen and Barley 1993). This anomalous mix of attributes makes the status of this work highly ambiguous.

The uncertainty surrounding the blue-collar technician's work is reflected in, and heightened by, workers themselves. Technical workers tend to simultaneously display traits and characteristics that have long been associated with elites and non-elites. Machinists operating CNC machines write and correct computer programs, use delicate and sensitive measuring instruments, and perform complex mathematical computations. However, they do so in a warehouse-like setting, surrounded by the clash of metal, debris, and grime (see Inman 1992). Operators in computerized pulp paper mills work in climate-controlled offices gleaming with chrome, yet wear blue jeans and work shirts on every shift (Zuboff 1988). Bank clerks wear business dress and work in office-like surroundings, yet they hold subordinate positions and earn a modest hourly wage (Adler 1992; Bailey 1989).

The culturally anomalous nature of technical work poses fundamental challenges for educators, employers, and educational reformers. The dualism between mind and body is deeply embedded in the social institutions that educate and train people for work. It is mirrored in, and reinforced by, the policies, practices, and attitudes predominant in schools, the workplace, and even families. The following examples are illustrative.[1]

- U.S. schools typically enroll students by age. Age groups are sub-divided by ability to facilitate learning across a diverse student body. Several studies indicate that ability grouping is often based on differences in race and social class. In extreme cases, teachers assume that non-white, working class children are less able than their white, middle class peers, and confirm those assumptions by treating each group accordingly (Rist 1970). Attention and praise is lavished on high achievers while low achievers receive less feedback and fewer learning opportunities. The differential treatment deeply informs students' sense of self-worth and ability: high achievers develop a sense of self-esteem and achievement in academic arenas while low achievers become discouraged and exhibit low self-esteem (Hamilton 1990). These attitudes respectively set the stage for the subsequent formation of white- and blue-collar learning styles, interests, and occupational aspirations.
- Selective socialization is an additional means by which youth are oriented toward white- or blue-collar work. Schools' primary mission is to prepare young people for the world of work. This entails not only teaching skills, but also inculcating behaviors and norms needed in the workplace. However, not all children experience similar forms of socialization. Teachers—particularly those with middle-class backgrounds—occasionally treat working-class and middle-class youth quite differently. For example, Leacock's (1969) seminal study of four urban elementary schools demonstrated that teacher behavior in the classroom can powerfully shape the types of behavior that students—and future workers—exhibit in organizational environments. In schools located in middle-class neighborhoods, teachers rewarded their charges for exhibiting self-control, demonstrating initiative, and collaborating with their peers. In a follow up study, Leacock (1969) noted that teachers in middle-class school encouraged students to learn to think and verbalize thoughts; academic achievement was stressed. These students, Leacock concludes, were being groomed for occupational and organizational roles requiring discipline, leadership, and responsibility. In contrast, through the distribution of rewards and punishments, teachers encouraged working-class students to be patient and submissive, passive and quiet and, most importantly, to demonstrate obedience to authority. Retaining facts and getting assigned work done were primary educational goals. These students were being socialized for positions requiring discipline, deference, and docility, characteristics required of blue-collar workers in hierarchical settings.
- In secondary school, pernicious distinctions initially drawn in primary grades can be deepened by the practice of tracking. Based on predictions regarding

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[1] It should be noted that these examples skim over an immense body of research on childhood socialization and educational outcomes in school and family environments. A comprehensive description of these literatures is beyond the scope of this paper. These examples are offered to illustrate the degree to which the mind/body dualism has pervaded educational practice.

their likely futures, students are directed into three educational "tracks": academic or college-preparatory, vocational, and general education. Both form of learning and content vary by track. Oakes (1985) reports that academic tracks emphasize learning and thinking skills and offer broad exposure to general principles and academic subjects such as mathematics, writing, and literature. Conversely, vocational and general education tracks emphasize rote learning and focus on basic skills such as arithmetic, juvenile literature, and simple writing skills such as filling out forms. Students respond predictably over the course of their enrollment: academically tracked students become engrossed in their studies and excited about their career prospects while non-academically tracked students become increasingly disengaged from school (Oakes 1985). This combination of selective skilling and attitude formation has made tracking a most effective means of channeling youth into white-collar and blue-collar occupations (Bowles and Gintis 1977; Oakes 1985; Hamilton 1990).

- The family also plays a prominent role in orienting youth toward mental or manual labor. For instance, the actions and beliefs of parents and older siblings exert considerable influence over occupational aspirations. Although most parents express interest in high levels of academic achievement and social mobility for their children (Sennett and Cobb 1972), middle-class parents are usually more intent upon setting their children on this course. They are more likely to help with homework, encourage children in their studies, and purchase study aids like encyclopedias for their homes (Heath 1983). Conversely, many working-class parents consider blue-collar employment to be an acceptable and honorable alternative to college for their sons and daughters. Indeed, suspicion of post-secondary education, credentials, and white-collar authority is deeply rooted in working-class culture, while the practical, physical nature of blue-collar work is valorized (LeMasters 1975; Willis 1977). Working class parents, and fathers in particular, therefore tend to place less emphasis on academic achievement or be actively involved in their children's' formal education (Willis 1977; LeMasters 1975).
- Patterns of education and socialization begun by families and developed in school are sustained in the workplace. For example, workers tend to receive quantities and types of training that conform to assumptions about the different needs and interests of blue- and white-collar employees. According to a 1996 survey conducted by the Bureau of Labor Statistics, workers with a high-school education or less were less likely to have received employer-provided training than their better educated counterparts. Less than sixty percent reported receiving some formal education, defined as structured training programs, classes, workshops, or lectures, while ninety percent of employees with baccalaureate degrees reported receiving such training (Bureau of Labor Statistics 1996). Also, the types of training opportunities extended to white-collar employees may differ markedly from those offered to blue-collar employees. For example, white collar employees are more likely to receive more costly, lengthy, academically-oriented, and non-job related (i.e.

personal development) training than their blue-collar counterparts, who primarily receive training that will improve performance on presently held jobs (Bureau of Labor Statistics 1996).

As the examples suggest, practices that emphasize knowing or doing, theory or practice, head or hand are pervasive throughout educational institutions. Although these practices may have been economically justified when most Americans earned their living by virtue of brains or brawn[1], they are increasingly untenable in an age when technization has blurred these cultural distinctions. By preparing students for either mental *or* manual work, schools, families, and employers deprive them of skills, aptitudes, and habits needed for qualify for technical jobs. While this may be of little consequence to those headed toward white-collar jobs, it effectively consigns blue-collar workers to marginal jobs and a low standard of living. Of course, these practices do preserve the status quo. However, one must question the utility and logic of any system that undermines the stability of society by broadening the gap between the rich and the poor.

Dissolving this cultural distinction will not be easy, for the notion that work is properly conceived as mental or manual is deeply rooted in, and constitutive of, social reality in hierarchical societies. If humans exhibit one common, enduring trait, it is a predilection for making differences. The making of difference involves drawing conceptual distinctions, or boundaries, used to categorize time, space, objects, people, acts, and other environmental elements (Zerubavel 1991). The social construction of difference is a positive attempt to impose a sense of meaning and order on a chaotic environment. Despite our penchant for categorizing and tidying, nature is notably resistant to the human desire for order; where human beings would see black and white, nature produces only shades of gray (Zerubavel 1991). By separating and classifying entities around us, we impose a comfortable sense of order on a natural environment that appears profoundly chaotic and disordered. Over time, classification schemes crystallize into cultural systems of belief and behavior that become normative and institutionalized. These views, though arbitrary, assume the status of social facts—they are simply the way the world "is." The taken-for-granted nature of the distinction between mental and manual work makes it highly resistant to change—people seldom question social facts unless they are hard pressed to do so. That it also preserves the cultural alignment used to apportion status and privilege merely strengthens such resolve.

Perhaps this explains why the mind/body dualism has received comparably little attention from educational reformers. With a few notable exceptions[2], the U.S. educational reform movement has neglected the cultural distinction between mental and manual work and the challenges it poses for upgrading worker skills. For instance, Berryman and Bailey (1992) note that well-known reform strategies, such as *A Nation At Risk* (1983) and *America 2000* (1991), are based on more traditional (and somewhat elitist) views of education and work. For example, education is conceived as an end in itself rather than a support for work. The focus is solidly on traditional academic subjects (mathematics, English, science, history, and geometry) with little consideration of contextual skills or learning in decontextualized environments. Reformers focus solidly on school-based reform; scant attention has been paid to the roles of family and employers in perpetuating the dualism. As a result, questions about the nature and implications of this cultural alignment abound. Answering these questions represents an important step in rooting out the problems associated with this distinction.

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[1] Although practices which channel a majority of youth into blue-collar jobs are economically sound, they are not socially just. The inequity of consigning working-class youths to working-class jobs is an issue that has long troubled social scientists (see Rist 1970; Sennett and Cobb 1972; Bernstein 1975, 1977; Bourdieu 1977; Willis 1977; Bowles and Gintis 1979; Dimaggio 1982; MacLeod 1987).

[2] For example, see Berryman and Bailey (1992).

Coda: What About Management?

Although the problems of lower-level workers and the non-college bound have received the bulk of scholarly attention, technization carries implications for managerial and professional workers as well. Given that technization can potentially decentralize knowledge and decision making, it is unlikely that managers and professionals will remain untouched by its effects. As production-level workers become increasingly knowledgeable and responsible, managers are relegated to facilitative roles—coach, orchestrator, teacher, resource-getter, consultant (Kissler 1994). Rather than directing and supervising the actions of others, managers increasingly perform tasks that help workers perform these tasks themselves—distribution of resources, coordination of action, negotiation, conflict resolution, and the like. Work becomes more interactive and collaborative at all organizational levels. Moreover, because the rank-and-file often perform tasks formerly reserved for management, fewer managers are needed in the technical workplace (Barley and Nelsen 1995).

This suggests that managerial skills in the technical workplace will differ markedly from those evident in the industrial workplace. Managers accustomed to giving and passing down orders must learn how to operate in a more interactive, egalitarian environment (Berryman and Bailey 1992). As workers gradually assume "managerial" duties, skills associated with the execution of managerial tasks may become less important. Instead, the ability to negotiate, communicate, and resolve disputes with work groups will be prized. This shift carries obvious implications for baccalaureate-level and graduate-level management education. Currently, these programs are oriented toward the acquisition of technical skills, particularly in the areas of finance, accounting, economics, and marketing. Interpersonal and facilitative skills may hold a more central place in business curricula of the future.

To date, very few studies have examined the nature of managerial roles in technicized work places. Thus, suggestions regarding technization's impact on managerial tasks or skill requirements remain speculative for the present. One finding that has emerged, however, is that managers do not easily give up power and authority to workers in instances of technization. For example, Zuboff (1988) reports that managers in the pulp paper mills she studied actively resisted attempts to empower workers. To preserve their power, managers denied workers access to training and information needed to truly exploit the informating potential of the new technology. By doing so, managers retained a firm hold on their authority, but did so at workers' and the organization's expense. Apparently, these managers are not alone, for studies indicate that a shortage of managers willing to share authority and power is a chief impediment to workforce empowerment (Simons 1995). Given that managers have the ability to influence the outcomes of technization for others, further study of their behavior in instances of technization is warranted.

Redefinition of Labor-Management Relations and Psychological Contracts

In recent years, the issue of psychological contracts has attracted increasing attention from organizational researchers. A psychological contract is an unwritten and largely implicit understanding of what employers and employees owe one another. It tacitly dictates obligations regarding effort, loyalty, security, advancement, and rewards. Thus, psychological contracts outline the terms on which the employment relationship is based.

Most of the research surrounding these topics centers on the changing nature of psychological contracts within American firms. Scholars generally agree that contracts between employers and employees have been radically rewritten since the mid-1980s. Relations once founded on security, loyalty, and long-term commitments are giving way to relations that are more tenuous, temporary, and explicit. This transformation carries implications for adult education and training as well as for security and benefits. To better understand these implications, it is useful to examine psychological contracts both old and new.

Employment Strategies and Psychological Contracts

Miles and Snow (1980) have identified two basic strategies of employment: buy or make. Firms that "buy" their employees pay current market rates for employees with specific skills that can be used immediately (Rousseau 1989). Employers typically have explicit contracts with employees, either written or unwritten, about the nature and duration of employment. Because the nature of their relationship is transactional, employers using a buy strategy seldom make long-term commitments to employees, and may be reluctant to make investments in employee training (Rousseau 1989). Generally speaking, firms contract with employees only as long as their specific skills are needed or useful. Employees are therefore motivated to keep job skills current and, in competitive labor markets, somewhat general.

Conversely, firms that "make" their employees pay less than current market rates for employees who lack some of the specific skills needed by the organization. These firms hire at entry-level and make subsequent investments to train and develop employees. Relations between employers and employees are characterized by long-term commitments: firms feature long-term employment practices and benefits and escalating returns to employees as their tenure increases (Rousseau 1989), while employees are expected to internalize organizational values and remain loyal to the firm. Because firms typically invest in training that is most useful to the firm and can expect to realize returns on training investments over a long period of time, training in "make" strategies produce narrow, specialized sets of skills that are firm-specific.

The choice of strategy is predicated on a firm's ability to anticipate organizational change (Rousseau 1989). In turbulent, rapidly changing environments, skill demands may shift frequently and unpredictably. Firms burdened by long-term commitments and a workforce with narrow, firm-specific skills find it more difficult and expensive to adapt to change. Hence, firms in turbulent environments typically opt for a "buy" strategy, which permits immediate skill demands to be met. In stable, predictable environments, firms can anticipate their skill needs for extended periods of time. These conditions are well suited for "make" strategies, which allow employers to enter the labor market at a lower initial cost and recoup extensive investments in training over time.

Between the 1940s and the mid-1980s, the "make" strategy was predominant among U.S. firms. These firms enjoyed a period of unprecedented growth in the decades following World War II. A combination of rebuilding efforts and the end of years of deprivation caused a surge of demand for manufactured goods both at home and abroad. Moreover, the economic infrastructures of many European and Asian competitors were devastated, leaving little competition for U.S. firms. These robust market conditions created a serious need for labor. Firms sought to satisfy their labor needs by making substantial investments in training entry-level workers and by building strong ties between themselves and employees through policies and practices designed to limit mobility and encourage tenure.

In this climate of prosperity, bargaining efforts by unions in key industries improved pay and benefits for union and non-union workers alike (Ehrlich 1994). With their increased need for labor and new-found wealth, employers typically met escalating employee demands. Indeed, some firms took great pride in their ability to provide excellent conditions and benefits for employees. This climate gave rise to employment practices featuring job security, promotional opportunities, annual increases in pay, vested retirement, and generous benefit plans (Ehrlich 1994). It also created some willingness among employers to retain marginal employees (O'Reilly 1994). These conditions gave rise to a contract which implied that employers would "take care" of employees as long as they are able to do so, and firms that were unable to do so would make provisions for workers who departed; conversely, employees would do what they were told, work hard for the employer as long as they were able to do so, and remain loyal to the firm. As workers aged, they would be rewarded for their years of effort and loyalty with increased pay, benefits, and job security. Gradually, the notion that good workers would remain with a single employer for long periods of time became taken for granted.

This bargain was firmly embedded in employment practices and employment relations until the 1980s, when a sharp increase in global competition brought America's economic boom to an end. European and Asian economies devastated by war had been rebuilt into formidable competitors in world markets by the 1970s. Due to considerable investments and technological innovation, the quality and cost of foreign products often matched or surpassed those of American firms. As a result, U.S. firms found themselves being outperformed in markets they once controlled. As economic prosperity waned and environmental uncertainty increased, employment practices altered considerably. Firms were increasingly unable or unwilling to make substantial investments in training that might be rendered obsolete in a relatively short period of time, or whose value may never be fully recovered (Ehrlich 1994). Consequently, a "buy" strategy of employment has become increasingly common among U.S. companies.

A new set of employment relations is evolving from economic turmoil. Because business environments are uncertain and skill needs are unpredictable, firms are less willing to make long-term commitments to employees (DiTomaso 1996). Job security and annual pay increases are less common, while employees are expected to pay for a greater share of benefit costs and to earn bonuses for job performance (Kanter 1986; O'Reilly 1994). As internal promotion ladders erode and competition increases, firms are also less willing to retain employees who are marginal, thus creating a climate of "organizational Darwinism" in which only the strong—or the immediately useful—survive (Rousseau 1989, 1990; Ehrlich 1994; Kissler 1994; Parks and Kidder 1994). Conversely, employees agree to work hard for an employer for the term of their contract, but otherwise owe no fealty to the firm. Employees remain loyal to employers only for the duration of their existing contract; thus, they are less likely to feel bound to or identify with any particular firm (Kissler 1994; Parks and Kidder 1994). These conditions have created a new deal between employers and employees: "There will never be job security. (Employees) will be employed...as long as (they) add value to the organization, and employees are continuously responsible for finding ways to add value. In return, employees have the right to demand interesting and important work, the freedom and resources to do it well, pay that reflects their contributions, and the experience and training needed to be employed here or elsewhere" (O'Reilly 1994, p. 44). Or, put less bluntly, "employers are responsible for creating opportunities for employees to take care of themselves" (Ehrlich 1994, p. 493). In other words, employers and employees jointly share responsibility for individual development and training (Baron and Bielby 1988).

A few firms have heeded these contractual changes by altering the types of training and development opportunities offered to employees. Rather than supplying only narrow, firm-specific training that limits employees' mobility, firms offer a broad spectrum of learning opportunities. General education courses useful in multiple organizations often prove valuable. Dubbed "career resilience" by scholars and career counselors (Waterman et al. 1994), this approach seeks to increase worker mobility and employability by improving job skills. For example, Sun Microsystems houses a career resource center on its premises and offers employees free career counseling and workshops to hone job search skills (Waterman et al. 1994). Similarly, Raychem Corporation has devised an elaborate mentorship structure that helps employees locate new jobs inside and outside the firm (Waterman et al. 1994). Although career resilience appears to benefit workers more than employers, the motives underpinning this strategy are not altruistic: by being perceived as a generous, supportive employer, firms hope to attract the best and brightest workers—a competitive advantage in a knowledge-based economy (Ehrlich 1994).

To date, relatively few firms have followed the examples set by Sun Microsystems and Raychem. Most training programs are job-related, while broad spectrum training is offered much less frequently (Ehrlich 1994). Moreover, firms are very selective when providing educational opportunities. The workplace is increasingly filled with "shamrock organizations" (Handy 1989)—firms that have a core of permanent workers who are surrounded by a periphery of "free agents" (Hirsch 1987). The core is comprised of employees who possess critical job skills and who are hard to replace. The periphery contains employees who posses generally available job skills and are easy to replace. Firms forge strong ties with core employees, but only weak ties with peripheral employees (DiTomaso 1996). Generally speaking, firms are far more willing to make substantial investments in training and developing core workers. Such investments increase the asset value of employees to the firm and, because of their long-term commitments, they may be recouped over time. In contrast, firms make fewer investments in peripheral employees, who are employed primarily to avoid long-term commitments and lower operating costs.

This implies that employees must be prepared to assume some responsibility for their own training and development. High levels of personal development are necessary not only to maintain employability in a turbulent labor market, but also to master the skills of current jobs. In environments characterized by organizational Darwinism, mastering current jobs skills is the most immediate and effective development opportunity available to workers (Ehrlich 1994).

Implications for Adult Education and Training

The new relationship between employers and employees can create potential benefits for employees. For instance, the new contract allows workers the freedom to seek out better employment opportunities and demand more interesting work assignments. However, their ability to seize these opportunities hinges on achieving and maintaining a high level of job readiness and employability. Workers must have the opportunity to train or retrain for new occupations, or to move to occupations or organizations with better employment opportunities (Brodsky 1994). In increasingly flexible labor markets, lifelong learning becomes a necessity rather than an indulgence.

One implication of lifelong learning is that individuals who would not have sought out training or new experiences in stable labor markets are now engaged in learning in formal settings. These individuals challenge traditional conceptions of the adult learner and the learning process. Adult learners are conceived as motivated, self-directed individuals who voluntarily engage in learning activities (Brookfield 1986), and learning itself is viewed as a smooth, linear progression toward a "surer self-image, greater confidence, psychological and material independence" (West 1995, p.133). Moreover, because students elect to enter school, they are presumably unaffected by conflicts between formal and experiential ways of knowing, or between their personal (worker, parent) and student roles (West 1995). Presumably, this sets adult learners apart from juvenile learners, who are considered to be less motivated, less responsible, and less engaged (Henry and Basile 1994).

But the adult learners currently making their way back into the classroom may not fit this idealized profile. Increasingly, retraining efforts are undertaken under duress, as a result of downsizing, outsourcing, project termination, technological obsolescence, or some other career-threatening event. Under these conditions, enrollment cannot be truly conceived as voluntary, and students may not be highly motivated to train. Indeed, adult learners are often deeply conflicted about their role as student, and may be attempting to piece together the fragments of shattered lives as they learn (West 1995). Conflicts may be deepened if students have been absent from school for extended periods of time (Henry and Basile 1994; West 1995), or if their customary style of learning is oriented toward experiential learning. These conditions suggest that, for many adult learners, training is an experience marked by conflict and uncertainty, as well as by challenge and achievement. Identifying ways to accommodate and support these individuals will be key to making lifelong learning a positive experience.

The Rise of the Service-Based Economy

The last three decades have witnessed precipitous declines in manufacturing employment. Between 1959 and 1984, the proportion of American workers employed in the goods producing sector fell from 60 percent to 28 percent (Johnston 1993). Meanwhile, technological advances, increased demand for services among the upper classes, and overall economic expansion have pushed employment in the service sector from 40 percent to 72 percent (Johnson 1993). In the 1970s, fully 90 % of job growth occurred in the service sector; in the 1980s, three-quarters of all new jobs were in services (Bills 1995). Approximately three out of every four American workers are now employed in service industries, while only about a quarter are employed in manufacturing, agriculture, and extractive industries combined (Johnson 1993). Service employment is expected to increase an additional 33 percent by 2005, with over half occurring in health care and in social and business services (Bulan et al. 1997). Clearly, these figures suggest that services, rather than manufacturing, will be the productive engine driving Western economies in the future.

The rise of a service economy signals changes in the nature of work performed by the bulk of the American workforce. The production of services is unlike the production of manufactured goods and raw materials in many respects (see Table 3). Goods are things or objects; they are tangible, transportable, and less perishable than services—if a good or raw material goes unsold, it can usually be stored and sold another day. In goods production, the act of production and the act of consumption are not simultaneous. Goods may be produced many days or weeks before being sold, and may be manufactured at great distances from the place of consumption. Because production and consumption are not simultaneous, workers and consumers are not co-present. The combination of temporal, spatial, and interpersonal distance makes a product and its producer conceptually separable in the consumer's mind—when we purchase a good, we seldom reflect upon the person who produced it. Appraisal of the quality and value of a product is based primarily on the tangible qualities of the product itself.

In contrast, services are deeds or acts; they are intangible, not easily transported, and highly perishable (see Table 3). If a service goes unsold on a particular day, say, an airplane seat or a motel bed, its value for that day is lost forever; it cannot be saved or stored to be sold in the future. In service production, the act of production and the act of consumption are often simultaneous. Services are seldom produced prior to consumption, and production may occur in the physical or virtual presence of consumers. Because services are intangible, images of services and the people who provide them are closely intertwined. When forming impressions about a service, consumers judge what they cannot see—the service itself—by what they can see—physical setting, equipment, symbolic accouterments, and the like (Upah and Fulton 1985). In interactive service encounters, or those involving face-to-face contact with customers (Leidner 1993), providers themselves act as visual endorsements of the services they provide. The provider's appearance and behavior works in conjunction with other situational elements to create positive or negative perceptions of the organization and the services it provides. For example, a restaurant patron may be dissatisfied with a meal served in a perfunctory manner even if the food, décor, and service are otherwise managed competently, and a home owner may be displeased with the service rendered by an unkempt, surly plumber even though the work performed was satisfactory.

While the distinctive nature of services and service production can potentially endow service work with many unique characteristics, only a few distinctive features have been examined. To date, the bulk of scholarly attention has been focused on the relational component of service work. "Relational skills" are comprised of skills and abilities useful in strategic interaction. Services are largely products of interaction between service providers and consumers, particularly in situations where the service component of the total product is a major element of that product (Czepiel et al. 1985). By strategically deploying relational skills in the context of service encounters, service providers and their employers attempt to influence consumers' behavior and perceptions in ways that favor individual and organizational objectives. Two interrelated types of relational skills are particularly useful: emotional labor and communication.

Emotional Labor and Service Work

The expression and manipulation of emotion is a key competency in service work (Rafaeli and Sutton 1987, 1989; Hall 1995). For many service workers, job success is defined not by producing and selling services, but by doing so in a way that customers find convincing and satisfying. Because the service and service producer are inextricably linked in the consumers' mind, the quality of the service hinges largely on the manner in which it is delivered. To be deemed satisfactory, workers actions, speech, and emotional displays must be consistent with consumer expectations (Bulan et al. 1997).

Leidner (1993) has identified three types of interactive service encounters in which the success of the production process hinges on the quality of interaction and, hence, the manner and attributes of the service provider: "In one type, the interaction is inseparable from the product being sold or delivered—for instance, in prostitution, in psychotherapy, or teaching. In the second type, a product exists apart from interaction, but a particular type of experience is an important part of the service. For example, patrons of Playboy Clubs expected titillation and deference as well as food and drink (see Miller 1984; Steinem 1983), and airline passengers, who buy tickets primarily to get from one place to another, are promised friendly service on their journey (Hochschild 1983). Finally, in some jobs the interaction is a crucial part of the work process even though it is not part of a product being sold or provided. The success of salespeople, fund-raisers, bill collectors, and survey interviewers depends on the workers' ability to construct particular kinds of interactions" (p. 26). Frequently used emotional displays fall into at least five broad categories: deferent behavior, empathetic behavior, friendly behavior, spontaneous behavior, and assertive behavior.

Displays of Deference. Deferential displays convey the service providers' willingness to "do for" (Bulan et al. 1997) the consumer. Activity in service encounters has always served a dual purpose. At an instrumental level, it is aimed at problem-solving through achievement of mutual goals: buying an airline ticket, getting a haircut, earning a paycheck. At a deeper, symbolic level, action in the service encounter ritualistically reinforces the cultural boundaries that divide elites from non-elites in hierarchical settings. From this standpoint, service is viewed as a cultural act that embodies and expresses beliefs about social order and the relations between parts of society—the encounter is a metaphor for society and those within it. Attempts to manipulate the behavior of others during the performance by implicitly or explicitly imposing rights, obligations, and rules reflect an attempt to symbolically control or protect social groups or institutions in society. When participants enact these rituals and conform to these rules, they tacitly signal their acceptance of the terms in their relationship and legitimate the social alignment they encode. Even the simplest, most routine transaction—buying a newspaper, ordering a meal—comes with a social agenda.

According to Goffman (1996), deference is a ceremonial act "which functions as a symbolic means by which appreciation is regularly conveyed to a recipient" (p. 239). *Symmetrical deference* is exchanged between social equals to signify their equality; examples include the many rules of etiquette used to signal mutual respect—introductions, hand shaking, and the like. In contrast, *asymmetrical deference* is exchanged between non-equals. These displays are used to confirm the inequality between superior and subordinate—deference is something that a subordinate *owes* a superior, but superiors *choose* whether to reciprocate (Goffman 1956). In the context of service encounters, customers are generally expected to symbolically project a sense of distance or "apartness" between themselves and workers, while the latter are expected to demonstrate obeisance. For example, wait staff in an expensive restaurant pay homage to patrons by a downcast gaze, working in silence, and not interrupting the patron's conversation. Such expressions of timidity and deference serve as a subtle, usually unconscious reminder to consumers of the status secured by their buying power and/or social position.

Displays of Empathy. Empathetic displays are intended to express a sense of nurturing or caring for service recipients. Developing empathy is critical to the provision of many services, particularly among those in which establishing trust or cooperation between consumer and provider is critical to the success of the production process. For instance, funeral directors' solemn and respectable demeanor encourages the clients' trust at a moment of deep personal crisis (Barley 1983). Nurses may behave in a soothing manner to coax fearful patients into following hospital procedures. And therapists and counselors may express sympathy and understanding to encourage traumatized clients to share painful or embarrassing secrets. As these examples suggest, demonstration of a felt sense of compassion and non-judgmental understanding helps service providers construct bonds of trust and communication between themselves and consumers. Such relationships are critical when consumers may be reluctant to extend their cooperation to providers.

Displays of Friendliness. Friendly displays signal the sense of warmth, sincerity, and helpfulness which has become commonplace in even the most routine and transitory service encounters. By making consumers feel welcome and appreciated, service firms cultivate good will and the many benefits it offers—repeat patronage, customer loyalty, positive word-of-mouth advertising, and the like. Consequently, service workers are frequently ordered to smile, offer warm greetings, and generally project an attitude of good cheer (Hochschild 1983; Rafaeli and Sutton 1987). Workers also make friendly gestures to obtain the good will of consumers. For example, Leidner (1993) reports that counter workers at McDonalds offered preemptive displays of friendliness "to discourage apparently irritable customers from becoming difficult" (p.130).

Displays of Spontaneity. Displays of spontaneity are offered to convince consumers that they are not being manipulated or duped. In recent decades, service work has become increasingly routinized; through processes of fragmentation and standardization of tasks, employers have greatly improved efficiency, consistency, and profitability of production in services ranging from fast food to phone sex (Leidner 1993). Scripted exchanges between service providers and consumers play an important role in achieving standardization and control in the production process. But many consumers are offended by the perfunctory, manipulative, or "phony" nature of scripted exchanges, particularly if the service provider plays her role clumsily. Moreover, customers may object to the notion that they are virtually interchangeable. To avoid these difficulties, service providers render their scripts in a spontaneous and sincere manner. This admittedly deceptive practice is followed in the belief that customers unaware of their interchangeability are unlikely to be dissatisfied.

Displays of Assertiveness. Assertive displays convey aggressive, unemotional, distant, or even hostile emotions to others. Although these emotions are seldom associated with "good" service, displays of assertiveness are critical for interactions intended to obtain compliance from potentially uncooperative individuals. For example, emergency medical technicians' occasionally project a tough, uncompromising demeanor to gain the cooperation of stubborn patients and unruly bystanders (Nelsen and Barley 1997). Harried convenience store clerks behave in a cold and distant manner to discourage customers from lingering during particularly busy times (Sutton and Rafaeli 1988). And bill collectors' use contrasting displays of friendly and aggressive behavior (i.e. "good cop vs. bad cop") to wrest overdue payments from borrowers (Rafaeli and Sutton 1991). As these examples suggest, the recipients of assertive displays are seldom the parties who have contracted for services. Rather, the service provider is projecting emotion on the consumer's behalf, just as bill collectors handle the unpleasant business of collecting delinquent accounts for banks and other businesses.

The type of emotional displays used in a line of work are determined by several factors. Perhaps the most important is the nature of the service being produced. The successful production of some types of services call for the creation of a specific emotional context in interaction. For instance, the bill collectors' aggression is often needed to bully delinquent borrowers into resuming payments, and empathy is vital to therapy, counseling, mediation, and other services requiring professional incursions into clients' personal lives. Managerial objectives also shape the types of displays manifest on the job. Employers direct workers to project emotions conducive to creating a certain atmosphere or relationship between consumers and the firm. Employers wishing to portray themselves as a warm, friendly place may direct workers to smile, make frequent eye contact, and otherwise make consumers feel welcome (Leidner 1993). Finally, workers employ displays of emotion to further their own goals, as when counter workers at McDonald's appear cheerful to deflect a consumer's hostility (Leidner 1993), or when waitresses joke and flirt with patrons to secure better tips (Hall 1993).

To date, most studies of relational skill have examined methods used by management to manipulate and control emotion on the job, as well as the manner in which service roles construct and reinforce traditional status hierarchies (Nelsen 1998) and gender roles (Hochschild 1983; Daniels 1987; DeVault 1991). Following Hochschild (1983), early studies of emotional labor assumed that the affective requirements of service jobs had a debilitating effect on workers' emotional well-being. Constructing an emotional display involves two interrelated processes. First, workers must exhibit behaviors suggestive of a desired (or directed) emotional state. Second, they must mask or conceal any felt emotions that obstruct the display of the desired emotional state (Rafaeli and Sutton 1987). It was widely believed that problems of inauthenticity, stress, and identity would inevitably result from suppressing one's true feelings and presenting "fake" emotions (see Hochschild 1983; Erickson 1994, 1995; Leidner 1993; Wharton 1993). Although ample evidence of these problems exist, more recent studies suggest that, under certain conditions, emotional labor improves job involvement and satisfaction with work (Bulan et al. 1997). Documenting the many forms of emotional labor in service work and its outcomes is a task that should occupy researchers for some time.

Communication and Interpersonal Skills

Communication and interpersonal skills are considered to be of primary importance in many lines of service work. All service work takes place in social settings and requires the cooperation of other people: clients, employees, supervisors, buyers, brokers, and so on. Therefore, service work requires coordination between workers and many other parties. Communication and interpersonal skills greatly contribute to the successful accomplishment of tasks. Moreover, information is the service rendered in lines of service work. Although information can be textualized, it is usually delivered partly or in whole in verbal form—counseling, financial advice, therapy, and negotiation are but a few examples. Assessments of service quality are based not only on the accuracy, timeliness, cost, and comprehensiveness of the information purchased, but also on the proficiency and clarity with which it is rendered. But what types of communication skills are important?

Jenkins (1995) has developed a typology of social and communication skills used in social encounters. Although designed to describe specifically skills used in social research, this typology is applicable to many lines of service work. Basically, Jenkins argues that social and communication skills can be roughly categorized as *sending* or *receiving* skills. Sending skills are used to initiate communication in the course of interaction; three types are common. *Reinforcement* consists of speech and acts that encourage in others a desire to continue or respond. *Explanation* is used for purposes of clarification; by soliciting and monitoring feedback in the context of interaction, actors determine the need for such clarification. The final sending skill is *self-disclosure*, which involves controlling one's behavior to manage the impressions of oneself formed by others. As their name suggests, receiving skills involve the reception of communication from others. Receiving skills include *listening* skills, both active and passive, as well as *questioning* skills, which entail sending interrogatory messages to others. Describing questioning as a receiving skill may seem odd, but because the goal of questioning is to receive information, this category is deemed appropriate by Jenkins.

Although communication is typically associated with verbal utterances, Jenkins (1995) notes that non-verbal communication is central to both sending and receiving. Types of non-verbal communication can be categorized as follows: "the use of space in relation to others; the use of time and interval; visual behavior (gesture, expression, and gaze); physical appearance; touch; paralinguistic vocalization (the delivery and accompaniment of speech); and the use of artifacts or other objects (speaking theatrically, props)" (Jenkins 1995, p. 20). Insofar as service work takes place in social settings, an appreciation of and sensitivity to both verbal and non-verbal cues in oneself and others are important for the successful execution of tasks. Not surprisingly, projecting desired images and emotional states via these cues is often a job requirement, particularly among jobs requiring customer contact.

Relational Skills and Adult Education

Relational skills—communication, social skills, and the ability to project emotional states—are key competencies in service work. Given that service workers comprise a growing proportion of the American labor force, the need for workers practiced in these skills will increase. Meeting these needs may be difficult, however, for the task of instilling these competencies presents educators and employers with some challenges.

One obstacle is presented by the "invisibility" of relational skills. As Neysmith (1996) observed, much of the emotional labor and social skills involved in service work is cloaked in rhetoric that assumes that workers possess these skills "naturally." Because they are seen as naturally occurring, employers seldom feel compelled to compensate workers for relational skills (Biggart 1989; Neysmith 1996). For example, nurses—who in the U.S. are predominantly female—are assumed to be caring and empathetic by virtue of their gender. Despite the fact that relational skills are central to successful nursing, nurses are compensated only for their technical skills.[1] Moreover, the invisibility of relational skills may cause educators to underestimate their importance and, as a result, pay little attention to inculcating them. Jenkins (1995) notes, for instance, that doctoral students in the social sciences are drilled in statistics, computing, questionnaire design, survey methods, interviewing techniques, observational methods, and other techniques used for data collection and analysis. Few, though, are made sensitive to or are tutored in the social and interpersonal skills needed to actually apply these techniques in practice. Clearly, our ability to instill and improve relational skills in the workforce is contingent on making these skills visible and, hence, valued and rewarded. Failing to do so risks neglecting a skill set that determines success or failure in the context of service work.

Another difficulty is presented by the "gendered" nature of relational skills.[2] Traditionally, relational skills have been strongly linked to gender roles. The bulk of emotional skills—empathy, deference, friendliness—and interpersonal skills have been considered “feminine,” while the ability to manipulate customers, be aggressive, and distance oneself emotionally from hostility is considered “masculine” (Williams 1989; Leidner 1993; Hall 1995). Female and male workers are assumed to respectively possess these competencies “naturally” due to their gender roles. Consequently, employers and employees define jobs in gendered ways and fill them accordingly. For instance, nursing, social work, home health aid, and other jobs requiring empathy, deference, and social skills are predominantly filled by females, while interrogation, car sales, and other jobs requiring assertive, manipulative behavior are predominantly held by males.

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[1] Nurses receive increments in pay as they gain credentials and experience. For instance, a registered nurse earns more than a licensed practical nurse, who earns more than a certified nurses aide, and so on. It is quite possible that lesser skilled nurses may, in fact, be the more compassionate, but this has no impact on wages.

[2] Social skills may also be culturally linked to race. Moss and Tilly (1996) report that 75 managers surveyed across 56 organizations expressed a belief that African-American males lacked "soft skills", defined as motivation and the ability to interact well with customers. In an economy dominated by services, such perceptions place African-American males at a disadvantage in labor markets.

Wittingly or unwittingly, this practice promotes social inequality by reinforcing occupational and gender-based stereotypes in the workplace. Many of the jobs which require “feminine” skills and traits—waitressing, home health visitation, day care, and so on—offer low wages, few benefits, and little status. Women may be locked into such jobs not only by a lack of technical or basic skills, but also by the fact that these jobs require relational skills that all women presumably possess. Similarly, their “natural” complement of relational skills allows men an advantage when seeking well-paying jobs in fields involving negotiation, mediation, and legal representation. The upshot is that occupational stereotypes of “women's work” and “men's work” are reinforced, and social inequality is extended. To avoid these problems, the link between gender roles and relational skills must be severed.

Breaking this link will be no easy task. That males and females naturally possess different types of relational skills and are therefore better qualified for certain types of service jobs is an idea rooted deeply in Western cultures. Social institutions, including the family, schools, and the workplace, construct and reinforce gendered definitions of work. Almost from birth, individuals are brought up to believe that males and females have a natural affinity for different types of work, including service work. As a result, the linkage between gendered jobs and job performance is largely taken for granted. Improving the employment opportunities for all workers through improved relational skills implies not just training or coaching, but also fundamental changes in how we define jobs and view the nature of relational skills. These changes must transform all social institutions involved in adult education and training if lasting, positive social change is to occur.

Interest and Investment in Organizational Learning

As the twentieth century draws to a close, it appears that Western economies are experiencing a metamorphosis whose scope may ultimately rival that of the Industrial Revolution. Economies long based on the mass manufacture of goods are increasingly based on the management of information, the production of knowledge, and the provision of personal and expert services. The growing importance of knowledge-based products and services suggests that firms can no longer gain a competitive advantage simply by efficiently managing physical plant, labor, capital, and other assets used to transform raw materials into manufactured goods. Rather, competitive advantage will flow from the ability to acquire and develop useful knowledge; the ability to effectively capture, store, and disseminate ideas; the ability to translate knowledge into new products and services; and the ability to protect the firm's intellectual capital (Stewart 1997). In short, a firm's success will rest upon its ability *to learn.*

Organizational learning or "knowledge management" is "the attempt to recognize what is essentially a human asset buried in the minds of individuals, and leverage it into an organizational asset that can be accessed and used by a broader set of individuals on whose decisions the firm depends" (Inkpen 1996, p. 79). Because learning in organizations is a human activity, firms can learn only through the thoughts and actions of individual employees. However, a firm's knowledge is greater than the sum of the knowledge held by individual employees—knowledge is recorded, stored, and embedded in processes and norms which remain after the departure of any single employee from the firm. Thus, organizations are said to have "memories" and to engage in learning activities that are beyond the scope of individual knowledge or behavior (Daft and Weick 1984).

Organizations have always engaged in learning activity and constructed collective repositories of knowledge in the form of procedures, rules, norms, and heuristics. But the 1990s have witnessed an unprecedented degree of managerial interest in organizational learning. The reasons are twofold. First, the products and services produced, distributed, and marketed by U.S. firms are becoming more knowledge-intensive (Stewart 1997). These may take the form of "smart" products that perform additional tasks for consumers or adapt to consumer preferences. For example, the computers featured in recently built automobiles "learn" an operator's driving habits and adjust the vehicle's performance accordingly, and coffee makers can adapt to consumer preferences by adjusting grind, brewing time, and other features. Firms that produce or market such products require a large cadre of technical specialists to conceive, design, build, distribute, advertise, and price them.

Knowledge-intensive products can also take the form of expert services. During the first half of the twentieth century, most of the services consumed were personal services—housekeeping, child care, laundry, gardening, and the like. These are services that consumers could provide for themselves if they wished to. In contrast, expert services are those that consumers could not provide for themselves even if they wished to. Consulting, counseling, teaching, discovering, diagnosing, interviewing, planning, and investigating are only a few activities that revolve around the buying and selling of expert services. In recent years, expert services have garnered a larger share of the consumer's dollar due to the growing complexity of knowledge, technological innovation, and regulation. For instance, in value-added terms, the financial services industry is nearly as large as all of manufacturing (Quinn 1993). The health care and delivery systems industry generated $900 billion in 1993 and is growing at a rate of fifteen percent per year (Quinn 1993). Firms in the business of providing expert services draw on rich pools of professional and technical talent to supply their wares.

Perhaps most knowledge-intensive are those firms that have made a business of selling knowledge. As computers have made the task of acquiring, storing, and distributing vast quantities of knowledge possible and economical, many firms have become information vendors. Information sold can take many forms—a list of names, addresses, airline reservations, hotel vacancies, consumer preferences, demographic data, and so on. A firm's competitiveness and, ultimately, its profitability hinge directly upon the quality and quantity of information it has to sell. Thus, firms in the business of vending knowledge often make substantial investments in employees whose primary task is to learn.

A second factor implicated in the growing importance of organizational learning is the turbulence and complexity of the business environment (Purser and Pasmore 1992). Change has always been a feature of the business environment, and adapting to change has been a part of organizational life. However, the scope and frequency of change in today's business environment are different from those experienced previously. In the decades immediately following World War II, the business environment was relatively stable. The technological, political, competitive, and regulatory changes that did occur were more or less stochastic—periods of turbulence were followed by periods of calm (Drucker 1992). Frost et al. (1986) has likened firms in these conditions to a raft floating on a river—when the raft was tossed about in rapids, crews adapted their skills and resources to successfully navigate the danger. But when rapids are followed by stretches of calm water, captain and crew relax their vigilance and efforts. Similarly, firms are less concerned with scanning and adapting to the external environment in periods of stability. Instead, internal matters take precedence, as witnessed by the proliferation of bureaucracy, hierarchy, and political schemes.

But extended periods of tranquility are disappearing for most American firms. The uncertainties produced by frequent technical innovation, scientific discovery, the globalization of markets, deregulation, shareholder activism, and political instability abroad are stretching periods of turbulence to a point where lasting periods of stability are almost unknown. Shorter product life cycles, accelerated product and process innovation, rapid technological obsolescence, market expansion and contraction, new competitors, political and regulatory uncertainties, and intense pressure from shareholders are now facts of life in most industries (see Berryman and Bailey 1992; Drucker 1992). In environments marked by turbulence, firms must be flexible and creative to flourish. They must continually hunt for new product ideas, search out information about competitors and markets, remain abreast of scientific discoveries and technological innovations, acquire new skills, and be aware of political and regulatory shifts that may affect the firm. These data must be acquired, disseminated, and applied to operations in a rapid, effective manner. As the examples of General Motors, Sears Roebuck & Co. and Eastman Kodak illustrate, firms that continue to focus inwardly in the face of environmental change quickly find themselves outpaced by more nimble competitors.[1]

The proliferation of knowledge-intensive products and environmental turbulence is largely responsible for the growing interest in organizational learning. The subject of organizational learning has attracted interest only recently, having received sustained scholarly attention since the late-1970s (see Argyris and Schon 1978; Weick 1979; Daft and Weick 1984; Kolb 1984; Sims et al. 1986; Tushman and Moore 1988; Von Glinow 1988; Brown and Duguid 1991). Feature articles on the subject appeared in the business press a few years later. However, organizational learning has begun to make inroads in organizational and managerial policy, as firms initiate a variety of schemes intended to transform workplaces into learning environments. The following section examines these activities in greater detail. To better understand the logic of these schemes, it is useful to briefly review the process of organizational learning.

Organizational Learning: Theory and Practice

Theories of organizational learning rest on the premise that learning is a part of work and that work involves learning (Dixon 1994). These activities are closely intertwined and cannot be practically separated. However, the objectives of learning in the workplace are different from those in the classroom: in the workplace, the goal is not to find correct information or "right" answers from knowledgeable people; rather, the objective is to construct meaning from the experiences we and others have in the world (Dixon 1994). Sense-making, or the construction and application of meaning, represents the core of organizational learning. The lessons learned are used to continuously transform the organization in ways that meet shareholder or owner objectives.

According to Dixon (1994), organizational learning is a cyclic process consisting of four interrelated activities (see Figure 1).

- The first step in the learning process is the *widespread generation of knowledge*. This includes activities aimed at collecting external data and generating internal information. Examples of the former include market research, benchmarking, and customer surveys, while auditing, experimenting, and brainstorming are examples of the latter. Ideally, knowledge generation will be a task assumed by all members of the firm rather than a few specialists, such as analysts or research and development personnel. By involving all employees in knowledge generation, firms can acquire more information. Also, because individuals perceive and experience reality in different ways, involving many employees generates diverse perspectives on a particular problem or issue. As Dixon notes, the resolution of differences through collective sense-making is a critical step (step 3 in Figure 1) in the learning process. Information should also be generated from a variety of internal and external sources, and the process should be continuous rather than episodic.

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[1] Each of these firms dominated their markets in the 1960s and early, 1970s, only to be toppled by more flexible, competitive rivals. Although many factors contributed to their downfall, chief among them were size, inefficiency, bloated payrolls, and a tendency to take their success for granted (see Loomis 1993).

- *Integrating new information into the organization* is the second step of the learning process. Once new information is acquired, it must be shared by disseminating it throughout the firm. Ideally, parts of the firm provide all others with accurate, timely, and complete information to the extent that it is strategically useful to do so. The requirements for successful integration are twofold. First, the firm must feature systems, practices, and norms that encourage and enable information sharing, such as integrated databases, compensation partly based on intellectual contributions and dissemination activities, and strong norms of reciprocity. The second requirement is the removal or minimization of barriers to the dissemination of knowledge. Organizational barriers to the dissemination of knowledge consist of the following: message routing, or the selective distribution of information; message summarizing, or reduction of size, detail, and complexity of the message; message delays in distribution; and message modification that distorts meaning (Daft and Huber 1987).
- The third step of the learning process consists of *the collective interpretation of information.* An organization's "mind" or "memory" becomes greater than the sum of its parts only if members collectively interpret and construct shared meaning from individual and group impressions, interpretations, and experiences. Basically, this involves coming together to wrestle with information and opinions. Members need not share the interpretations arrived at by the collective, but they should have an understanding of the reasoning behind the collective's position. Encouraging collective interpretation involves two activities. First, the firm should develop conditions that enhance and encourage collective sense-making activity, such as a size and configuration that support frequent interaction between employees. Second, firms should promote values and norms conducive to collective interpretation. Dixon has identified three core values that encourage collective interpretation: freedom to speak openly and without fear or coercion; equality, which must exist if freedom is to exist; and respect, which must exist for equality to exist.
- The final step of the organizational learning cycle involves *bestowing authority to act on collective interpretations.* If organizations do not permit members to implement new ideas or solutions generated by the sense-making process, learning is lost. Not only is the loss wasteful, but employees frustrated by their inability to act on their ideas also become frustrated, angry, and, occasionally, subversive. To encourage responsible action, members should be allowed to try out new ideas and make changes when necessary.

Together, generating new knowledge, integrating new information into the organization, collective interpretation of information, and bestowing authority to act on collective interpretations comprise the organizational learning process. Although they logically progress in the order given, the activities overlap one another and may occur in an iterative fashion. For example, a team engaged in collective interpretation may step back to generate more new knowledge if they discover that key facts are missing. Each activity comprising the learning process is necessary for learning to take place. If the process terminates prior to completion of all four activities, learning will not have occurred (Dixon 1994).

The learning initiatives employed by firms address one or more of the activities listed above. Virtually dozens of examples have appeared in the business press, and many more initiatives have undoubtedly gone unreported. Thus, it is impossible to offer a detailed, comprehensive description of all learning initiatives currently underway in U.S. firms. But the following list illustrates some representative efforts.

Generation of New Knowledge. Firms employ numerous practices to externally and internally generate knowledge or information. Externally generated knowledge, or knowledge that exists outside the firm, can be obtained by formal or informal means. Formal initiatives are planned, structured efforts to acquire information from the external environment. Most of the standard types of data collection used in firms are of this type: focus groups, customer surveys, benchmarking, and the like. Unstructured or informal efforts to generate external information can also be useful. For example, Dixon (1994) described a hospital that offered a small bonus to employees who visited other medical facilities while vacationing in other regions or countries. The innovative ideas that employees picked up during their visits were disseminated and discussed among hospital personnel upon the employee's return. Similarly, a construction company urged its employees to identify and report new construction projects encountered during their off hours. This information helped the company keep abreast of competitor's activities and become aware of future subcontracting opportunities.

Efforts to generate knowledge internally seek to uncover untapped knowledge and best practices already residing within a firm. Again, these can be formal or informal. Formal efforts identify and transfer internal knowledge in an explicit, structured manner. Examples include the identification of internal best practices and the creation of "official" forums for sharing knowledge. For example, McKinsey Consulting annually sponsors an event dubbed the "Practice Olympics," wherein consulting teams from branch offices around the world gather to share innovative ideas and practices (McKinsey & Company: Managing Knowledge and Learning 1997). A panel of managing partners judge teams and award prizes for the most innovative and useful offerings. Informal efforts to internally generate knowledge are unstructured and unplanned. These practices encourage or enable employees to casually share what they know in social forums, such as work breaks, chance encounters in hallways, or electronic mail chat sessions (see Becker and Wicker 1982; Becker 1985-86).

Integration of Knowledge. In modern work organizations, workers must act in concert with one another to complete organizational tasks (Dixon 1994). Workers must have at least some understanding of what others are doing in order to coordinate their actions effectively. Schon (1979) has used the example of shovel-making to illustrate the practical importance of a shared understanding of organizational goals. Prior to the industrial revolution, a single craftsperson performed all tasks associated with making a shovel: selecting and shaping the wood for the handle, forging and shaping the blade, assembling the shovel, and so on. The craftsperson could perform these tasks effectively because she carried an internal image of what a shovel was like and how it worked. In modern organizations, different people or units perform the discrete tasks involved in shovel-making. Unless everyone shares a common understanding of what the shovel should look like and do, individuals and units will work at cross purposes and quality and efficiency will suffer.

A common understanding can be developed only if information and knowledge is widely disseminated and integrated throughout the organization. Initiatives directed toward improved dissemination may establish systems or practices that facilitate the storage and access of knowledge. For instance, companies such as McKinsey Consulting, Price Waterhouse, Silicon Graphics, and the Kao Corporation have developed extensive on-line databases that employees may access at will (Dixon 1994). Boeing has adopted CATIA, a software program that integrates the work of hundreds of individual design engineers. This program allows engineers to identify conflicting designs in the conceptual stages of research and development, thereby avoiding costly rework (Rogers 1996). And both McKinsey Consulting and general Electric sponsor annual "best practices" seminars that allow employees to gather and share ideas and insights that can be applied elsewhere (Dixon 1994). Initiatives that discourage obstacles to dissemination are also useful. For instance, Northern Telecomm attempts to overcome obstacles created by hierarchy by designating a space—known as the "pink room"—in which hierarchy does not exist (Dixon 1994). In this space, employees are encouraged to speak openly, challenge others, and voice dissenting opinions without concern for rank or fear of reprisals.

Collective Interpretation. Initiatives aimed at enhancing collective interpretation of information revolve around (1) creating opportunities for interaction among employees and with non-employees and (2) removing barriers to collective sense-making. Interaction is important because "organizational learning occurs at the interfaces between persons, between organizational units, and between the organization and its external environment" (Friedlander 1984, p. 199). Individuals or collectives "learn" only if and when their taken-for-granted understandings and tacit assumptions are challenged and altered by discrepant information. Such information issues from other people, units, or firms (Tushman and Scanlon 1981; Argyris 1990; Dixon 1994). By creating opportunities for interaction, firms increase the likelihood that discrepant information will be encountered and, hence, learning will occur. Such encounters are even more likely if barriers to collective interaction and sense-making are removed.

Firms create opportunities for learning in many ways. Typically these involve measures that increase opportunities for employees to meet and interact with others, either physically or virtually. For instance, an organization's size and physical layout can greatly enhance interpretive activity. Chaparral Steel has deliberately remained small (less than 1,000 employees) to promote communication and sense-making (Dixon 1994). Larger firms encourage sense-making through the use of designs, physical layouts, and technologies that increase the frequency of interaction. Propinquity greatly increases the chances of frequent interaction among employees—members who are separated by corridors or floors are far less likely to encounter and interact with one another on an informal basis, and it is during these "chance" encounters that much information is shared. Thus, firms occasionally group relevant employees together in physical spaces to encourage interaction. Some firms also provide "caves" or "coves"—comfortable spaces in which employees can briefly meet and talk—to encourage sense-making activity (Becker 1985-86).

Hierarchy, with its emphases on inequality, control, and unidirectional communication, is perhaps the greatest barrier to collective interpretation (Friedlander 1984). Traditional organizational practices such as the creation of "expert" and "non-expert" roles, task fragmentation, and limited dissemination of knowledge effectively bar collective sense-making by tacitly suggesting some ideas are more worthy than others. Initiatives directed toward removing barriers are usually targeted at decentralizing decision making and promoting egalitarianism among all employees. For instance, Johnsonville Foods and General Electric have created forums in which all workers associated with a particular problem or work process gather to contribute ideas and make suggestions (Stayer 1990; Honald 1991; Dixon 1994). One of General Electric's "Work-Out" sessions may bring together fifty or more people to think about a problem or process over the course of several days (Dixon 1994). The ideas generated at these sessions are weighted by technical merit rather than the rank of their contributor. Chaparral Steel and Lincoln Electric have encouraged collective sense-making by eliminating many of the symbols of inequality that are commonplace in most hierarchical settings (Kantrow 1986; Quick and Gray 1989-90). At Chaparral, for instance, managers do not enjoy reserved parking spaces, an executive dining room, plush offices, or other "perks" associated with executive status. Assiduous removal of status symbols tacitly suggests that management's ideas are not more valuable or worthy than those of the rank and file.

Authority to Act on Constructed Meanings. The generation, integration, and interpretation of knowledge is pointless if organization members are denied authority to act on this knowledge. Initiatives aimed at authorizing action empower workers directly or create incentives to act. For instance, Johnsonville Foods and Chaparral Steel encourage employees to search for innovations and process improvements by offering profit-sharing plans (Dixon 1994). By encouraging initiative and responsibility, firms increase the likelihood that employees will engage in self-directed, spontaneous learning that benefits the firm as a whole. Employees are encouraged further when firms avoid "punishing" them for errors or failures.

Organizational Learning and Adult Education

In turbulent, knowledge-intensive business environments, the potential benefits of organizational learning are considerable. Practices such as benchmarking, brain storming, and sharing best practices can achieve breakthroughs in productivity and performance by breaking established paradigms and creating readiness for action (O'Dell and Grayson 1998). Moreover, the emphasis on learning and knowledge sharing can improve employee skills and partly offset employers' reluctance to make substantial long-term investments in employee development.

Unfortunately, managing knowledge is not as simple as offering training or exhorting units to act like a "learning organization." Several problems can undermine efforts to manage knowledge effectively, including the tacit nature of intellectual capital, the "unmanageable" nature of distributed knowledge, the presence of organizational barriers, and managerial reluctance to embrace learning. These problems represent a barrier to the dissemination of learning practices and thwart efforts at learning.

Tacit Nature of Intellectual Capital. Broadly speaking, two types of knowledge are applied in work activities: formal and informal. Formal, conceptual knowledge consists of facts, principles, theories, algorithms, and other abstract, systematic forms of knowledge. It is usually explicit and decontextualized—characteristics that render this knowledge easily codifiable (Brown and Duguid 1991). Hence, formal knowledge is found in manuals, protocols, computer programs and various textual resources found in the workplace. Informal, contextual knowledge consists of know-how, intuition, heuristics, work styles, and other situated understandings about materials, tools, and techniques (Barley 1994; Barley and Nelsen 1995). It is largely tacit, embedded in activity, and tied to the particulars of work in a given setting. Because informal knowledge is seldom articulated and somewhat variable, it is rarely written down. Instead, these understandings are lodged in the collective memory and work practices of the local community of practice. It is passed informally, and often orally, among practitioners as problems spontaneously arise in the context of practice. Because it is bound to the particulars of a problem or work context, it is difficult to systematize informal knowledge.

Most of the knowledge that people need to successfully implement tasks is informal (O'Dell and Grayson 1998). So-called "unskilled" and semi-skilled workers have always relied almost exclusively on such knowledge (Kusterer 1978), and workers with considerable formal training make extensive use of informal understandings. For example, technicians and technologists employed in fields where post-secondary education is either mandatory or customary claim that formal knowledge is far less important than the informal knowledge gained through experience and participation in the local community of practice (Barley 1994; Barley and Nelsen 1995). Professionals also report that much, if not most, of the learning central to their work took place after they completed formal studies and immersed themselves in work activities (Schon 1983; Wagner 1987; Wagner and Sternberg 1985). This implies that the bulk of knowledge used among all occupations is tacit.

Most efforts to capture and store knowledge focus on formal knowledge for the simple reason that informal knowledge is not readily codifiable. Because tacit knowledge can only be vaguely articulated or described, it is difficult to codify.

Traditional forms of organizational communication—electronic mail, spreadsheets, memos, newsletters, handbooks, standard operating procedures—cannot acquire, store, and transmit uncodified knowledge. Instead, learners have to watch or speak with knowledgeable others to acquire informal knowledge. Moreover, because tacit knowledge is passed spontaneously as problems occur, it is seldom passed along in a speedy, systematic manner. Acquiring tacit knowledge, then, requires that workers immerse themselves in work contexts, often for extensive periods of time.

Unfortunately, most learning initiatives operate on the presumption that knowledge is codifiable and therefore readily distilled into rules, directories, memos, data bases, and the like. Moreover, knowledge is assumed to be relevant for the variety of work settings that exist across the firm. For instance, practices such as internal benchmarking explicitly assume that practices useful in one setting can be readily transferred to others. The tacit and highly specific nature of organizational skill and knowledge seriously undermines these assumptions. One is led to conclude that learning initiatives necessarily exclude a large portion of the information vital to work practice. Indeed, some scholars have estimated that as much as 80 percent of the knowledge that needs to be transferred is uncodifiable and therefore unexploited (O'Dell and Grayson 1998). This problem is exacerbated by the fact that organizations have limited access to occupational communities and communities of practice—the repositories of most contextual knowledge.

The "Unmanageable" Nature of Communal Knowledge. Communities of practice are loosely structured occupational groups whose boundaries are defined by face-to-face encounters within a particular work site (Wenger 1992; Lave and Wenger 1991). These small, local groups may form sub-sets of occupational communities, which are larger, more formally structured groups spanning various work sites. Van Maanen and Barley (1984, p. 287) define occupational communities as groups of people who consider themselves to be engaged in the same sort of work; whose identity is drawn from the work; who share with one another a set of values, norms and perspectives that apply to but extend beyond work related matters; and whose social relationships meld work and leisure. Because these characteristics represent the aggregate of a variety of work sites, their level of generality is typically high. Communities of practice may also feature these characteristics; however, because notions of membership, identities, values, and relationships are shaped by the specifics of work in a particular setting, one can expect to witness considerable variety in the ways people identify and behave at the local level.

Communities of practice and occupational communities serve as the primary repositories of informal, contextual knowledge. Wenger (1990) has suggested that communities support a collective memory of contextual knowledge. It is unlikely, if not impossible, that any single practitioner could replicate all of an occupation's knowledge through personal experience. In fact, the contextually specific nature of such knowledge militates against this possibility. A communal memory allows individual workers to perform their work without bearing the burden of the community's accumulated knowledge. So important is this function that some sociologists consider the ability to access and contribute to communal memory as the hallmark of occupational membership (e.g. Wenger 1990; Lave and Wenger 1991).

Accessing communal memory entails remembering relevant bits of information when a problem crops up and retrieving the precise information needed. These feats are accomplished through open exchange of information among community members, which involves asking and answering questions, as well as overhearing, learning from, intervening in, correcting, and commenting on conversations (Wenger 1990). Joint participation seems secured by the mutual realization that work would be practically impossible and unbearably stressful if practitioners could not rely on one another to supply needed information. This represents a sharp contrast from hierarchically ordered work systems. Because trading information offers leverage for positioning oneself in a hierarchy, hoarding knowledge is characteristic of hierarchically ordered work systems (Wenger 1990). However, the absence of direct competition in occupational communities implies that hoarding information offers no leverage. Hence, practices of hoarding are not condoned. In fact, the opposite is true: it is incumbent upon community members to actively participate in ongoing exchanges of information whenever it is meaningful and possible to do so.

Without question, the knowledge distributed among communities of practice is a valuable organizational resource. However, leveraging this resource is extremely difficult. Although the tacit nature of communal knowledge is partly responsible for this difficulty, problems associated with accessing and managing communal knowledge also play a role.

The skills and knowledge required to obtain informal knowledge will be very different from those used to gain formal knowledge. To access formal knowledge, one has but to obtain the manual or program in which the knowledge is stored and find the needed information within. These resources are typically an "unrestricted good" provided by the employer and freely available to all employees. Indeed, newly hired workers can expect to receive numerous policy manuals and handbooks upon arrival at their new jobs. Manuals and textbooks are on hand for all who need them. Software is installed in workstations frequented by many employees. Thus, any worker with the ability to read and open an icon can acquire formal knowledge on the job. But informal knowledge is not an unrestricted good possessed by the employer and freely shared by all. Rather, it is the intellectual property of the community of practice in a given work setting. To access this information, workers must successfully insert themselves into the community of practice and become an accepted member (Graves 1989; Brown and Duguid 1998).

Membership in a community of practice is neither automatic nor given. Members choose to bestow membership on individuals believed to be acceptable and worthy. Communities of practice are inherently practical; members are less likely to invest time and effort in tutoring neophytes who appear to be technically or socially inept. Thus, the quality of a neophyte's informal education depends largely on their ability to create an impression suggestive of competency, sociability, and belongingness. Most informal knowledge is transmitted spontaneously, usually as relevant problems are encountered in the course of work activities, and passed among workers in the form of bits of advice, stories, demonstrations and brief instances of guided practice (e.g., see Barley and Bechky 1994). One must be an "insider" to be actively included in such exchanges. Moreover, frequent contact between neophytes and experienced workers increases the likelihood that informal understandings will be passed (Gerholm 1990). Neophytes who display considerable social prowess are more likely to enjoy the company of peers and, consequently, receive more opportunities for informal instruction than those perceived as social misfits.

Because informal knowledge is controlled by communities of practice, managers are unable to mandate the transference of informal knowledge. Communities of practice set their own rules and norms, and are accountable to no one save themselves (Stewart 1997; Brown and Duguid 1998). If community members deem an individual unpromising, members may ignore managerial exhortations to share their knowledge. Conversely, members may ignore organizational directives to protect or withhold knowledge from outsiders if they believe that information sharing is necessary and useful. Nor are managers able to easily create or manage communities themselves. Communities of practice emerge spontaneously and voluntarily around a particular work process or class of problems. Because processes and problems may involve many types of practitioners, community members may be distributed across work groups, organizational units, or different organizations (Barley and Nelsen 1995). They cannot be created by managerial fiat (Stewart 1989). This fact distinguishes communities of practice from project teams, task forces, committees, and other intentionally formed work groups.

The unstructured nature of informal knowledge and communities of practice create a managerial dilemma for organizations. Informal knowledge comprises the bulk of skill and knowledge employed in practice and can make the difference between success and failure. Given that wealth and competitive advantage are increasingly drawn from intellectual resources, managing informal knowledge is becoming more important for organizational success. Yet, this knowledge is distributed among a community of practice that is basically unmanageable, at least in a conventional sense. In fact, attempts to formally manage or control such groups can destroy them (Stewart 1997). How, then, can informal knowledge be effectively leveraged?

The importance of communities of practice has been recognized only recently in the business press. Hence, methods of "managing" communities and distributed knowledge are not yet well developed. But three insights have emerged. First, management can assist communities of practice simply by recognizing them and the role they play in disseminating knowledge. For example, National Semiconductor has granted communities of practice semi-official status by creating a Community of Practice Council (Stewart 1997). Second, managers can encourage learning by giving communities resources they need to share knowledge, such as funding for guest lecturers, occasional get-togethers, and letting members co-locate offices and work areas (Stewart 1997). Finally, managers can aid communities by resisting attempts to control or direct them (Stewart 1997; Brown and Duguid 1998). Communities flourish when they are self-directed, and imposing an agenda or rules on these unstructured groups greatly diminishes their effectiveness.

Organizational Barriers to Learning. Structural, cultural, motivational, and logistical features of organizations can thwart efforts to share knowledge. As O'Dell and Grayson (1998, p. 157) observe, "organizational structures that promote 'silo' behavior, in which locations, divisions, or functions are so focused on maximizing their own accomplishments and rewards that they, consciously or unconsciously, hoard information and thereby sub-optimize the total organization" are a serious obstacle to learning. Self-interested behavior occurs when units do not share common goals or a common fate (O'Dell and Grayson 1998). Without them, units have little incentive to interact or share knowledge. Unfortunately, the lack of common interests is characteristic of the structural forms predominant among U.S. businesses, namely, the functional and divisional forms.

Organizational culture can also bar efforts to transfer knowledge throughout the firm. Organizational culture is defined as the characteristic traditions, norms, values, and symbols that employees share (Schein 1983). Some aspects of culture can directly or indirectly inhibit knowledge transfer. For example, a tradition of rivalry and competitiveness among organizational units can lead to hoarding knowledge, as units attempt to best one another by denying others information that might be useful. Some cultures, particularly in engineering and knowledge-based companies, value personal expertise and the creation of knowledge over knowledge sharing (O'Dell and Grayson 1998). And some organizations are afflicted with "not-invented-here" syndrome, or a tendency to devalue ideas or knowledge that are not internally generated.

Norms and values that limit knowledge sharing may be reinforced by compensation practices that reward employees for self-interested behavior. Generally speaking, individuals perform activities for which they are rewarded, and avoid activities which are unrewarded or punished (Kerr 1989). If they are rewarded for individual contributions and not for taking the time to learn and share knowledge, workers have little incentive to engage in learning behavior. However, developing incentives for learning is no simple task. Unless the process of sharing knowledge is inherently satisfying, extrinsic rewards will be ineffective and may breed cynicism (American Productivity and Quality Center 1997). To be intrinsically rewarding, sharing must be celebrated and valued within the organizational culture. Moreover, rewarding learning behavior is problematic because it is difficult to determine when and how much learning has actually occurred. For example, a firm may reward employees for submitting papers and reports to a communal knowledge management system because submissions are easily measured. However, such metrics fail to document learning which may or may not have resulted from the submissions. An enterprising employee might therefore earn handsome rewards for making submissions of little practical value. Until metrics are devised that accurately gauge the outcomes of knowledge sharing, rewarding learning behavior will remain problematic (Stewart 1997).

Organizational logistics also create hurdles that must be overcome. As companies expand regionally, nationally, and globally, locations, divisions, and functions become spatially and temporally distant. Loss of proximity and lack of contact can loosen ties between organizational units and their members. As a result, lines of communication, relationships, and common perspectives become increasingly tenuous. Over time, units that do not work side by side can become completely isolated and ignorant of one another's activities. Isolation can occur even when the distances between units are modest. For example, Apple computer's hardware and software divisions grew distant from, and even hostile to, one another even though the buildings housing the units were separated only by a busy street (Carlton 1997). To overcome logistical barriers, organizations must create physical or virtual forums in which units can interact and share their expertise (O'Dell and Grayson 1998).

Managerial Reluctance to Embrace Learning. As Friedlander (1984) cogently notes, hierarchy is perhaps the greatest barrier to organizational learning. Learning implies that knowledge is shared vertically, or between organizational levels, as well as horizontally, or across locations, divisions, and function. Since the dawn of the Industrial Revolution, organizational authority and expertise have been arranged hierarchically. Those higher in the hierarchy not only have power over those below, they are also generally assumed to have greater expertise. In fact, in a hierarchical division of labor, superiors can exercise authority legitimately only to the degree that their knowledge encompasses, or is perceived to encompass, that of their subordinates (1968). By fragmenting tasks and appropriating craft knowledge, early industrialists stripped labor of its power (Braverman 1974). Managers have bolstered their claims to authority and power by controlling and centralizing organizational knowledge ever since.

Because organizational learning entails sharing knowledge, it threatens to undercut the legitimacy of the hierarchical system of authority on which most organizations are premised. As organizational and technical knowledge are disseminated throughout the firm, management's claims to be arbiters of organizational issues ring increasingly hollow for employees. Unable to derive credibility from their position alone or to make knowledgeable decisions autocratically in a world of distributed expertise, administrators would find themselves ultimately relegated to the important but somewhat less heady role of coordinating resources and linking experts at the right time and the right place.

Although some managers may enthusiastically support a more democratic distribution of knowledge and decision making, most will probably exhibit some resistance to the idea. Learning initiatives require managers to alter well-established patterns of behavior and manage employees in ways far removed from traditional patterns of command-and-control. Leadership in learning organizations is cooperative and interactive, qualities seldom fostered in the competitive, high-pressure environments of business schools and executive suites (Senge 1990; Kanter 1991). That learning threatens traditional bases of power and authority merely heightens managerial resistance. Reactions can range from reluctant acceptance to determined efforts to subvert learning initiatives. To counter this reaction, firms must devise and reward positive behaviors and promote managers who embrace learning initiatives, and business schools must carefully consider the social lessons learned by students.

RECOMMENDATIONS FOR NATIONAL DATA GATHERING EFFORTS ON ADULT EDUCATION AND TRAINING

This report has argued that four workplace trends are currently reshaping the educational and training needs of U.S. workers: the impact of computerized technology on work skills; the redefinition of post-war labor-management relations; the rise of a service-based economy; and increased interest in organizational learning. Computerized technologies have become pervasive throughout most, if not all, economic sectors. These technologies carry a capacity to either upskill or downskill work in organizations, occupations, and economic sectors. Although it is far from conclusive, the evidence drawn from case-based and aggregate studies of skill composition in computerized work environments suggests that the workforce as a whole has experienced modest, gradual upskilling, although deskilling, upskilling, or both is witnessed in various work domains. These findings confirm that at least some blue-collar workers are experiencing technization, wherein work becomes cleaner, more abstract, more conceptual, and less physical. Because the requirements of upskilled jobs often outstrips workers' limited educational preparedness, workers must upgrade conceptual skills to successfully compete for technical jobs. But doing so requires overcoming deficits of ability and will, learning styles inimical to technical practice, and the mind/body duality pervasive throughout learning institutions.

From the economic turmoil of the last decade a new relationship has emerged between employers and employees. Simply put, firms are less able or willing to make long-term investments in and commitments to all employees. Resources for training and developing will be reserved primarily for core employees, while employees in the periphery (or a third party) must assume more of their development costs. Moreover, all employees must search for ways to continually add value to the firm in order to retain their jobs. Making a successful adjustment to this change requires that workers engage in lifelong learning and search for ways to increase employability.

Perhaps the most important structural change in the American economy is the shift toward a service-based economy and the accompanying decline in manufacturing employment. Over three-quarters of the adult American workforce is currently employed in services, a figure that attests to the economic dominance of services. Because service production differs from goods production in some fundamental ways, it is likely that the rise of a service-based economy carries implications for skill requirements and training. To date, only two skill requirements have received sustained scholarly attention: emotional labor and communication skills. The interactive nature of many service jobs demands that service providers demonstrate ability in both areas, a fact that suggests that communication and social skills are important components of service training. However, educators must contend with problems created by the invisibility and gendered nature of social skills.

The past decade has witnessed an unprecedented interest in organizational learning and knowledge management among U.S. firms. As the economic environment becomes increasingly turbulent and services and products become more knowledge-intensive, at least some companies are realizing that intellectual capital may represent the only sustainable competitive advantage available now and in the future. (Ironically, this realization is dawning at a time when firms are purging their ranks of human assets and rewriting the psychological contracts with employees—a schizophrenic reaction spurred by emphases on short-term market gains, strategies focused on market competition rather than a competition for intellectual assets, and a poor understanding of the fundamental socioeconomic shifts driving the need for intellectual assets.) Consequently, some companies have undertaken measures to transform their organizations into learning environments, typically through vehicles intended to encourage formal and, less commonly, informal learning in the workplace. Although promising, these efforts face some formidable obstacles: the tacit nature of skill and knowledge, the unmanageable nature of distributed or communal knowledge, organizational impediments to knowledge transfer, and the challenge learning presents to the balance of power between key participants.

Like the educational practices and outcomes they measure, national data collection efforts have been consistent with the needs of an economy based on mass manufacturing of goods. Embedded in the studies designed to track and understand education are guiding assumptions shaped by, and uniquely suited for, an industrial environment. These include ideas about what should be studied, who should be studied, where learning takes place, and how learning should be studied. However, the combined pressures of technological change, the rise of services, new employment relations, and organizational learning are changing the skill requirements of jobs and the contexts of learning, thereby rendering collection efforts inconsistent with the needs of an information-based economy. Educational policies and practices are only as good as the information used to design them. Thus, realigning data collection efforts with current trends in the workplace must be a priority. But what must be done?

Recommendations

1. Broaden conceptions of work skill to capture contextual, social, and job-search skills.

The evidence from studies of technization, service work, and the changing nature of employment relations suggests that jobs of the future will require a complex mix of skills and abilities that are not characteristic of many industrial jobs. For instance, the hybrid nature of technical work requires production-level workers to exercise conceptual skills and a capacity for self-directed action. The interactive nature of service production places a premium on emotional and interpersonal skills. And the increasingly tenuous nature of employment relations makes job-search skills a vital addition to the peripheral worker's skill portfolio.

Traditional measures of work skill have adopted a relatively narrow view of job-relevant skills. For instance, most of the studies listed in Table 1 employ direct or indirect measures that approximate only two dimensions of job skill: substantive complexity and autonomy-control. More recent accounts of essential job skills are more comprehensive but, as this oft-cited example suggests, they too neglect critical aspects of skill: knowing how to learn; reading, writing and computation; listening and oral communication; creative thinking and problem-solving; self-esteem, goal setting/motivation, and personal/career development; interpersonal skills, negotiation, and teamwork; and organizational effectiveness and leadership (Carnevale, Gainer, and Meltzer 1988, p. 9).

- If policy makers and educators are to devise training programs and curricula that meet the current and future needs of American workers, conceptions of job-relevant skill must be broadened. More specifically, essential skills should include employability skills (job search, interviewing, negotiation, etc.), non-verbal and affective relational skills, and, perhaps most importantly, contextual skills. Given that contextual skills may comprise up to 80 percent of the skill content of some jobs, their inclusion in skill profiles and performance measures is especially critical.

2. *Examine* how *people learn as well as* what *they learn.*

To date, national data collection efforts have focused largely on what students learn or, more to the point, what they do not. Educational research and reform efforts have revolved around the contents of education and training programs. Evidence of poor performance is considered to be indicative of poor content or delivery. Hence, reform initiatives generally seek to improve educational preparedness by bolstering content. Although these efforts are useful, they overlook an important fact: what people learn is largely a function of how they learn.

Styles of learning influence what students pay attention to and what they ignore, what they do and do not, what interests and disinterests them. As a result, styles of learning have a profound, albeit indirect, impact on outcomes of education and training. An understanding of predominant learning styles, their acquisition, and the role they play in learning is key to improving the educational preparedness of the workforce. For even the best designed and delivered programs and experiences will fail to produce results if people are not predisposed to learning from them.

- Reform efforts would benefit from a more detailed picture of the attitudes, habits, and preferences that comprise styles of learning, as well as a better understanding of how predominant styles are distributed throughout the current and future workforce. Such knowledge facilitates the development of theoretical models of stylistic differences.

- If outmoded styles of learning are to be molded to the practical exigencies of the technical workplace, a comprehensive understanding of how styles are acquired is needed. Styles of learning are developed and reinforced over time in a variety of educational settings. Examinations of style acquisition should therefore encompass the developmental activities occurring across multiple social domains.
- Investigations of learning styles must uncover the many ways in which the attitudes, habits, and preferences that comprise a style affect the learning experience. For instance, how do styles of learning affect classroom behavior, study habits, and engagement with various types of material and experiences? A detailed knowledge of the dynamics of these styles in the learning environment is key to developing styles more felicitous to the shifting educational needs of current and future workers.
- Finally, factors that enhance students' ability to overcome or transcend the limitations of outmoded styles of learning must be identified. A better understanding of why some people overcome deeply ingrained habits and preferences and why others do not will facilitate the development of styles of learning well-suited to current and future educational needs.

3. Focus on collective as well as individual learning.

Learning is a social activity. Whether it occurs in the context of a classroom, apprenticeship, family, workplace, or in silent conversation with an author, a learning activity is almost always a dynamic, interactive process (see Heath 1983; Scribner 1984, 1986; Lave 1988; Brown and Duguid 1991; Lave and Wenger 1991; Orr 1990, 1991). Indeed, the degree of interaction in learning environments can have a substantial impact on the quality of the learning experience (Nelsen 1997). Yet, learning is typically conceived as an individual endeavor or an activity involving interaction between pupil and teacher. Hence, conventional data collection efforts have focused on individual rather than collective sense-making in learning environments.

Although studies of individual cognition and performance have yielded many valuable insights, they invariably neglect dynamics of learning in groups. To be sure, groups and organizations learn only through the meaning structures of individual members, but, as Argyris and Schon (1978, p. 20) explain, "...individual learning is a necessary but insufficient condition for organizational learning." Successful learning within groups involves earning access to collective meaning structures (Dixon 1994). Accessing these structures requires mastery a complex set of social dynamics and cultural norms (Nelsen 1997). Given that successful work practice hinges on mastery of informal knowledge embedded in collective meaning structures, employers and policy makers would do well to develop a more detailed understanding of collective learning in work settings.

- Learning initiatives would benefit from a more detailed understanding of the nature of communities of practice and distributed knowledge. Although these concepts have captured much interest from scholarly and lay audiences, many of the basic characteristics and social dynamics of communities of practice remain a mystery. For example, little is known about how they emerge, grow, and die, how knowledge is acquired and distributed, or how the various rules governing members' conduct evolve. As a result, knowledge of the conditions that alternately encourage or impede the formation of communities of practice is limited.
- Also useful would be insights on individual learning in communities of practice. Individual learning within communities is contingent upon being accepted as an actual or probable candidate for membership. Currently, only a few studies have examined the process by which neophytes gain access to collective meaning structures embedded in the community (see Graves 1989; Haas 1989; Nelsen 1997). Armed with a more comprehensive knowledge of how various types of communities socialize and tutor initiates, employers and educators could devise more effective means of transferring distributed knowledge.

4. Focus on workplaces as learning environments.

For decades, social scientists have concentrated on classroom dynamics and their link to performance-based outcomes. Consequently, we know a great deal about how people learn in school settings. Yet, despite evidence suggesting that the bulk of knowledge used in work practice is acquired on the job, we know comparatively little about how people learn in work settings, implying that researchers have either assumed that socialization and learning terminates abruptly with schooling, or that workplace learning is relatively unimportant.

The growing importance of organizational learning, knowledge management, and retraining clearly challenges this assumption. In a turbulent, knowledge-based economy, the welfare of companies and their employees rests on the ability to learn in work and non-work environments. This shift has created a pressing need to understand workplaces as learning environments. At least three types of data are needed to do so.

- The first is an understanding of the motives and reasoning underlying organizational decisions to adopt competitive strategies based on learning and invest in knowledge management. Although some firms have embraced organizational learning, these early adopters represent a minority of American companies. Much skepticism surrounds the value and strategic importance of knowledge, primarily because short-term returns to knowledge management initiatives remain elusive. By developing a clearer picture of factors shaping decisions to adopt learning strategies, policy makers and business leaders are better prepared to design incentives to encourage investments in workplace learning.

- It is important to identify and describe organizational conditions conducive to learning. Initial research in this area has already identified several key factors that facilitate knowledge sharing, namely, physical and virtual proximity, free access to knowledge, incentives for knowledge sharing, cultural norms that value learning, and the establishment of formal and informal forums for transfer activity. However, this list is far from exhaustive. A more detailed and comprehensive understanding of the elements that encourage learning would help managers, human resource specialists, and business educators design effective learning programs.
- A comprehensive understanding of organizational impediments to learning is critical for the development of effective practices for knowledge management. Even the best conceived learning initiatives can run afoul of organizational dynamics that block learning. Fully documenting these structural, cultural, logistical, political, strategic, and managerial barriers is a necessary first step to devising means to overcome them.

5. Identify manifestations of the mind/body duality in learning institutions.

The dualism between head and hand is perhaps the greatest barrier to preparing the workforce for an information-based economy. As Dewey observed over one-hundred years ago, the mind/body dualism is harmful for two reasons (Cremin 1961). First, by marking mental skill as different from and superior to manual skill, the mind/body dualism promotes an exclusivity for which there is no empirical basis. Second, because mental work is prized more highly than manual work, this distinction promotes inequality in the social division of labor. The prevalence of technization adds a third item to this list: because technical jobs require both mental and manual skill, institutional practices that promote exclusivity and inequality effectively block production-level workers from acquiring the skills needed to obtain high skill, high wage jobs.

Dissolving the distinction between head and hand will be difficult. As Berryman and Bailey (1992) note, the distinction between mental and manual gains much of its "staying power" from its ability to create and mark privilege. The people who stand to lose status from its dissolution are also in the best position to orchestrate its demise. The people who stand to gain are the least powerful and most marginalized members of society. Dissolving the mind/body distinction is also made difficult by the fact that the distinction is pervasive throughout society. Families, schools, and employers have a hand in reproducing it. Thus, simply altering policies and practices in schools or the workplace will prove insufficient. But perhaps the greatest obstacle to dismantling this distinction is the fact that it is largely taken-for-granted by most members of society. The mind/body dualism is deeply embedded in class culture, social identities, styles of learning, and other cultural forms. There is a felt sense of "rightness" regarding these forms and the ideas within them that make them resistant to critical examination and questioning.

- A first and necessary step toward dissolving the mind/body distinction is the collection of data regarding its current manifestations in all learning environments. For instance, distinctions between head and hand have shaped parental attitudes toward learning and careers, educational practices in schools, and the organization of work in workplaces. Systematic identification of divisive practices and their outcomes may provide the compelling evidence needed to undertake more lasting change in the social environment.

6. Investigate the experiences of lifelong learners.

Educators have long assumed that adult participation in lifelong learning was a voluntary activity undertaken for self-styled career changes or personal enrichment (Brookfield 1986). Consequently, the learning process was conceived as a relatively smooth, comfortable, and linear process unbroken by conflicts or doubt. Adult learners themselves were considered to be highly motivated and engaged in learning, largely because learning was a matter of choice. However, many adult learners currently engaged in lifelong learning fail to fit this profile. They may be training as a result of downsizing, technological change, or other significant life changes. In these circumstances, learning is undertaken as an effort to repair a fragmented career or broken lifestyle rather than to achieve personal enrichment. Students may therefore bring with them a host of fears, doubts, and conflicts that can affect the outcomes of the learning experience.

- Data collection efforts should identify the dynamics and outcomes associated with "less voluntary" training efforts. Examinations should identify the type and source of the conflicts and uncertainties experienced by such learners, as well as how these phenomena affect performance. An understanding of these dynamics is necessary to assist lifelong learners through the education process.

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Table 1. Case Studies of Technological Change and Skill Requirements

Authors	Sample	Methodology	Skill Measures	Outcomes
Bright (1958, 1966)	Assemblers, machinists and metalworkers in highly automated manufacturing plants		Twelve measures of work skill, including physical and mental effort, responsibility, and decision-making	Mixed effects; some occupations upgraded, others downgraded
Faunce (1958)	Machinery workers in an automobile engine plant	Self-reports drawn from a random sample of workers	Six measures of work skill: closeness of supervision; responsibility; control over pace of work; alertness; worker-supervisor relations; worker-coworker interaction	Mixed effects; workers experience less control over work pace, closer supervision (downgrading), increased responsibility, alertness, new relations with supervisors, greater isolation from coworkers (upgrading)
Kraft (1977)	Computer programmers	Approximately 100 programmers interviewed; participant observation	No measures explicitly defined or directly measured; dimensions discussed include degree of cognitive complexity and worker control	Downgrading; work was simplified, routinized, and standardized; a minority of systems analysts and engineers experienced upgrading
Burawoy (1979)	Machine shop workers in engine plant	Participant observation	No direct measures, measures not explicitly defined; dimensions discussed include task complexity worker discretion, autonomy	Mixed effects; some occupations upgraded, others downgraded
Hull, Friedman, and Rogers (1982)	Printers	Self-reports drawn from two samples	Subjects' estimations of physical and intellectual demands of work	Upgrading; majority reported experiencing fewer physical demands, increased intellectual demands of work

Table 1. Case Studies of Technological Change and Skill Requirements (continued)

Authors	Sample	Methodology	Skill Measures	Outcomes
Wallace and Kalleberg (1982)	Self-reports drawn from compositors, linotypists, and machine operators in printing industry		Wage rates as an indirect measure of skill	Downgrading; wage rates declined relative to several comparison wages; decline may be due to factors other than skill changes
Adler (1983)	Clerical occupations in four French banks	Observational study	No direct measures; dimensions discussed include responsibility, abstract reasoning, task interdependence	Upgrading; subject acquired new skills as a result of automation
Kelley (1986)	41 occupations utilizing numerical control technology in UK, U.S.A, West Germany, and Japan	Cross-national comparative survey	Whether operators perform some programming tasks	Mixed effects; upgrading and downgrading with skill polarization; outcomes seem to be firm-specific
Vallas (1988)	Operators, maintenance workers, clerical workers, customer content service representatives in telecommunications	Self-reports drawn from two samples	Direct measures of skill as substantive complexity and autonomy-control	Mixed effects; upgrading via compositional shift, both down- grading and upgrading of content among select occupations
Nelsen (1996)	Automotive technicians effort	Non-participant observation; self-reports of skill change	No direct measures of skill; dimensions discussed include physical effort, abstract reasoning, interpretation of texts, symbols, and diagrams required overall	Mixed effects; expanded intellectual skills of some occupational specialties, decreased intellectual skills of others; less physical effort

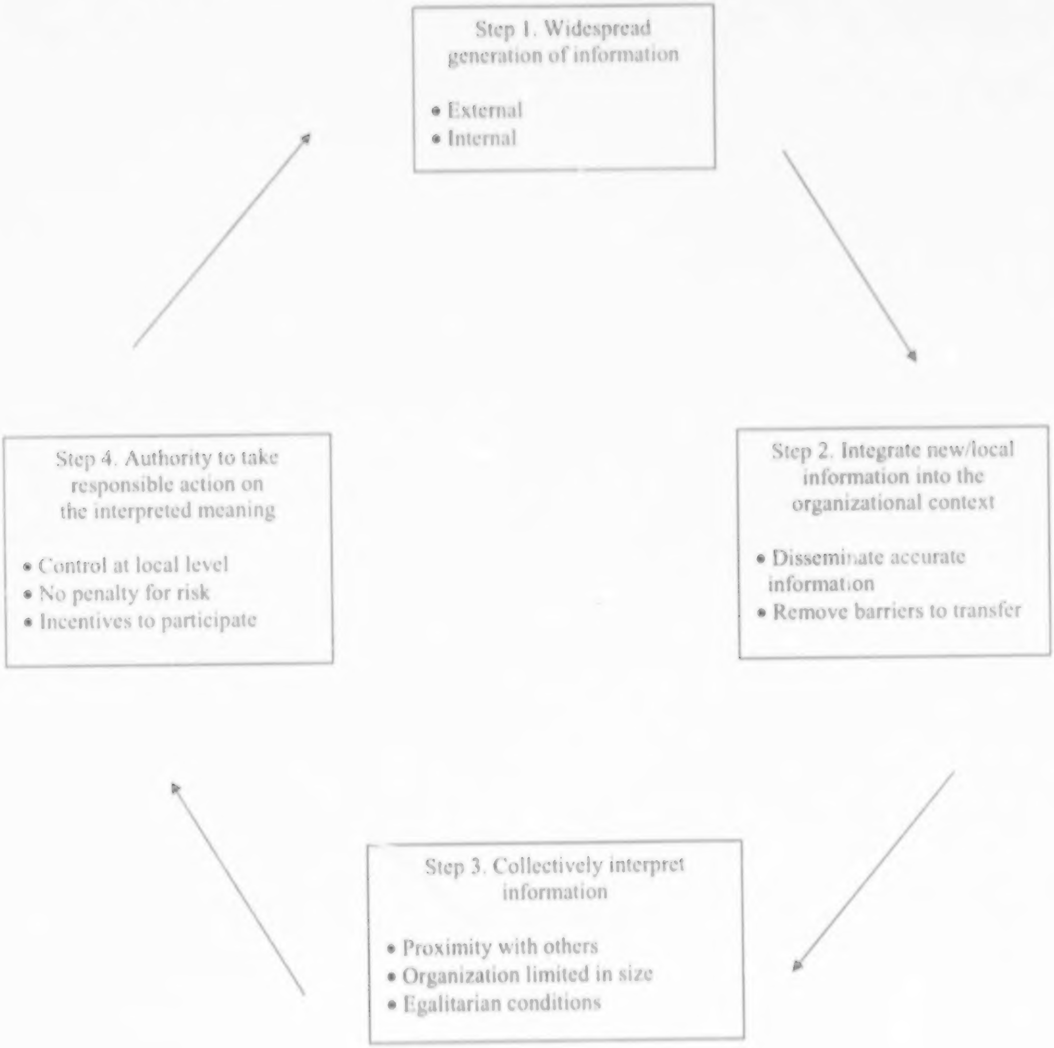
Source: Adapted from Spenner (1995); Nelsen (1996)

Table 2. Aggregate Studies of the Effects of Technological Change on Work Skill: Skill and the Distribution of Earnings

Authors	Sample	Skill Measures	Outcomes
Berg (1970)	1950-1960 decennial census distributions; 4,000 Department of Transportation (DOT) job titles; second edition titles for 1950, third for 1960-1970	For jobs; DOT general educational development (GED) as indicator of skill	Modest compositional upgrading; 15% of jobs had lower GEDs, 31% were higher, 54% of jobs unchanged
Berg, Freedman and Freedman (1978)	1950-1970 decennial census distributions	For jobs; DOT GED as indicator of skill	Modest compositional upgrading
Spenner (1979)	5% sample of fourth edition DOT titles compared with third edition DOT titles	For jobs; DOT indicators for data, people, and things	Modest upgrading; little net change
Rumberger (1981)	1960 census and 1976 Current Population Survey	For jobs; DOT GED as indicator of skill	Modest compositional upgrading, slight content upgrading
Reanalysis of Dubnoff (1978) data; see Spenner (1982)	Decennial census distribution for all gainful workers (1900-1930) or all employed workers (1940-1970)	For jobs; DOT indicators for data, people, and things	Little net change
Karasek, Schwartz, and Pieper (1982)	National samples of adults working 20+ hours/week for 1969, 1972, and 1977	For people; aggregated into 240 occupational categories; dimensions discussed include learning new things, creativity, and task repetition	No change in skill detected

Source: Adapted from Spenner (1995)

Figure 1. The Organizational Learning Cycle


Step 1. Widespread generation of information
• External
• Internal
Step 2. Integrate new/local information into the organizational context
• Disseminate accurate information
• Remove barriers to transfer
Step 3. Collectively interpret information
• Proximity with others
• Organization limited in size
• Egalitarian conditions
Step 4. Authority to take responsible action on the interpreted meaning
• Control at local level
• No penalty for risk
• Incentives to participate

Source: Dixon, 1994

Table 3. Differences Between the Production of Goods and Services

Goods:	Services:
— are things or objects	— are deeds or acts
— are tangible	— are intangible
— are less perishable	— are highly perishable
— are transportable	— are less transportable
Goods Production:	Service Production:
— production and consumption not simultaneous	— production and consumption simultaneous
— consumers and workers not co-present	— consumers and workers co-present
— product and producer conceptually separable	— product and producer conceptually inseparable
— utilizes stockpiling	— stockpiling difficult

Sources: Berry (1984); Upah and Fulton (1985); Mills (1986)

INFORMAL AND AVOCATIONAL LEARNING

by Barbara H. Butler

PURPOSE

The primary goal of this essay is to identify critical issues in the areas of informal and avocational learning in the context of lifelong learning. A full understanding requires that these be considered from the perspective of both the learners and the providers of educational services and materials. It is also essential to give attention to the definition of terms in order to provide a clear framework for discussing the issues, facts, and trends in informal and avocational learning. The distinctions and overlaps between these two terms inform the discussion throughout the paper. Informal learning is a powerful means of learning, one that reaches into many learning contexts in contemporary American life. This essay emphasizes and illustrates this breadth. The primary emphasis is on informal learning because this is a process of learning that has broad implications and widespread applications. In addition, there is a large body of research in informal learning, which makes it worthy of particular attention. Avocational learning arises from a narrower subset of learning motivations and thus flows from one of a number of reasons for engaging in the broader process of informal learning. The paper's ultimate goal is then to make recommendations regarding the relations between national monitoring data and these issues.

Overview

During the last ten to fifteen years, educators, community leaders, and analysts have given an increasing amount of attention to the concept of lifelong learning. As the principals at the Center for LifeLong Learning and Design, University of Colorado, Boulder, argue, " . . . learning can no longer be dichotomized into a place and time to *acquire* knowledge (school) and a place and time to *apply* knowledge (the workplace). Our efforts recognize the facts that today's citizens are flooded with more information than they can handle and tomorrow's workers will need to know far more than any individual can retain. Making learning a part of life is an essential challenge for inventing the future of our societies. Lifelong learning is a necessity rather than a luxury to be considered. Self-directed learning is the dominant form of lifelong learning." (Fischer et al. 1998, p. 1). There is clearly a growing agreement that policy makers need to understand, evaluate, and promote lifelong learning activities. This paper focuses on the roles of informal learning and avocational learning in an adult's lifelong learning experiences. It will be demonstrated that informal learning and avocational learning are fundamentally separate issues, though there is some overlap between the two.

Definition of Terms

The term informal learning is rarely defined when it is used in general conversation. It is a concept that, by its very nature, leads to misunderstandings. This results in confusion in communication (Crocket 1997) and in the failure of some to comprehend fully the inherent strengths of this learning strategy. There is less confusion about the term avocational learning. As noted above, for the purposes of this paper, it needs to be understood that informal and avocational learning are not synonymous or tightly linked conceptually. Each is defined below.

But first, to put the topics of informal learning and avocational learning into context one needs to begin by agreeing on basic concepts of learning and of education. Both learning and education have a "process" and a "product" component. The active process of learning involves collecting and processing information. The product of learning is the acquired wisdom, knowledge, or skill. It is also important to remember that there are two parties in the process – the instructional materials/provider-developer on the one hand, and the learner on the other.

Thus, the issues to be considered when examining education and learning are indeed broad. Not only are there questions surrounding the transfer of knowledge, skills, and abilities, but the process of learning can be conceptualized as involving as many as seven additional major factors (Falk 1995): prior knowledge and experience; subsequent, reinforcing experiences, motivation, and attitudes; culture and background; social mediation; design and presentation; and the physical setting.

Informal learning, here considered more a process than a result, is one of three basic learning strategies. The other two are nonformal and formal education. (Table 1 compares the characteristics of the three types of learning.) Most educators see these strategies falling along a continuum, with indistinct rather than sharply defined borders. Some learning activities may be perceived as belonging exclusively to one structural format, but learning activities may share aspects of more than one format. The differences in the formats are based on such variables as the learner's motivation, whether there is an attendance requirement, the presence of a mediator/teacher, and whether there is a performance assessment, among other elements (see Table 1).

One can find in the literature extensive discourses on informal education and its relationship to nonformal and formal education. Formal definitions of these terms are available in educational dictionaries (Examples include Husen and Postlewaith 1985; Page, Thomas, and Marshall 1977; Roundtree 1981; and Coombs 1973). But even before these definitions were codified in these dictionaries, John Dewey wrote extensively on the subject. In 1926 Edward Lindemann extended Dewey's thinking and defined adult education as "a co-operative venture in non-authoritarian, informal learning" (Watkins and Marsick 1992). The following definitions are based on these sources. The words education and learning are different but tend to have considerable overlap as used here.

- *Formal learning* takes place in a planned way at recognized institutions such as schools, colleges, universities, etc. A teacher mediates learning in a formal setting and the student generally follows the teacher/leader's agenda. The motivation for learning is extrinsic to the learner. The teacher's goal is to impart knowledge and the learner's goal is to increase his/her knowledge and skills.

- *Nonformal learning* proceeds in a planned but highly adaptable way in institutions, organizations, and situations outside the spheres of formal or informal education. It shares with formal education the characteristic of being mediated learning, but the motivation for the learning may be wholly intrinsic to the learner. Examples of nonformal education are continuing education courses, Elderhostels, organized field trips and museum visits, structured programs developed by leaders in organizations such as the Girl Scouts, Boys and Girls Clubs, and 4-H Clubs. The learner's objectives may be an increase in skills and knowledge, but they may also include emotional rewards that might flow from an increased love for a subject or an increased passion for learning as a result of the activity.
- *Informal learning* is voluntary and self-directed. It may occur spontaneously in everyday life situations, within the family circle, the neighborhood, and so on. This kind of learning results from personal exploration and discourse. Informal education is distinguished from the other two by having no authority figure or mediator. The learner is motivated intrinsically and determines the path taken to acquire the desired knowledge, skill, or abilities. Learning can be in the cognitive domain but it is also equally important to recognize that informal learning encourages learning in the affective and psychomotor domains.

Table 1. Characteristics of Formal, Nonformal, and Informal Learning*

Attribute	Formal	Nonformal	Informal
Location	Classroom, school	Classroom-like settings	Anywhere
Atmosphere	Supervised; may be repressive	Supervised, but usually supportive	Supportive
Motivation	Largely extrinsic, compulsory	Generally intrinsic and voluntary	Intrinsic, voluntary
Learning manager	Teacher	Teacher/expert	Self-mediated
Learning theory	Content-focused, teacher directed	Content-focused, teacher or expert directed	Hands-on, learner directed
Age level in learning groups	Homogenous age levels	Age level clusters	Homogenous or multigenerational
Assessment	Goal oriented, frequent evaluation of performance	Can be either goal oriented or not	Non-goal oriented, only individual would assess performance
Learning domains	Predominantly cognitive	Largely cognitive and moderately affective	Cognitive and affective
Rewards	Long-term; degrees, licenses, certificates	Tangible and immediate, certificates	Immediate, intrinsic
Implementation costs	Expensive, high overhead	Less expensive, moderate overhead	Least expensive; low overhead

*Based on Tamir (1990-91) and Russell (1995)

Maarschalk (1988), after presenting definitions of formal, nonformal, and informal learning, illustrates his perspective of the continuum among them. "A typical example of informal science arising from formal science teaching," he writes, "would be school pupils in a bus or coffee bar spontaneously discussing a topic or problems posed in the class. If the discussion broadens to the point where it leads to additional coaching or schooling, it would be regarded as nonformal science teaching. An example of informal science teaching flowing over into formal science teaching would be if a stimulating problem discussed spontaneously (informal science teaching) after a science TV show (nonformal science teaching) is taken up again at school (formal science teaching). The close interrelationship of the three interdependent but clearly distinguishable forms of science teaching is evident."

Advocates of the importance and value of informal, self-directed learning are passionate about its distinctive value. Informal science education, for example, ignites an inquiry in which Bruner (1961) sees an "autonomy of self-reward" and "maximizing (of) the conditions of inquiry." Green (1971) calls this spark the "mother of motivation." Advocates feel informal learning is powerful particularly because the learner is intrinsically motivated. As the lead character in the movie *Chariots of Fire* said, "It comes from within!" Educational research is demonstrating that motivation is a strong predictor of the effectiveness of the learning activity. "Studies conducted in a great variety of settings by different investigators have shown that a common experiential state characterizes situations in which people are willing to invest psychic energy in tasks for which extrinsic rewards are absent...We have called this common experiential state the flow experience, because it is generally described as a state of mind that is spontaneous, almost automatic, like the flow of a strong current" (Csikszentmihalyi and Hermanson 1995, pp. 69-70). But other qualities characteristic of informal learning include the ability of the learner to integrate knowledge in his or her own conceptual and experiential framework, to construct new knowledge in a manner that is personally meaningful, and to integrate cognitive, affective, and psychomotor elements.

For this essay, *avocational* learning is defined as learning motivated by a personal, non-job related interest: it is learning for pleasure. Adult avocational learning may include activities that are related to any interest outside the workplace and outside professional interest. It may be learning to enhance knowledge about such interests as hobbies, travel, community involvement, medicine, art, international relations, cultures and religions of the world, and any other topic that comes to mind. Adults may use any of the above formats (formal, non-formal, informal) for pursuing avocational interests. It is in the realm of motivation that the strongest overlap exists between informal and avocational learning (see Table 2). Generally an avocational learner is intrinsically motivated, and that is an important element in the definition of informal learning. Adult avocation learning, however, is not restricted to the informal learning mode. Frequently avocational learners are engaged in nonformal learning courses offered by museums of all types, universities' continuing education or lifelong learning programs, or in courses offered by community groups such as churches, libraries, or the YM/WCA.

Table 2. Associations of Learning Strategies with Vocational and Avocational Learning

	Avocational Learning	Vocational Learning
Formal Education	Associated	Strongly Associated
Nonformal Education	Strongly Associated	Associated
Informal Education	Strongly Associated	Rarely or Not Associated

The focus here is primarily on issues related to the strategy of informal learning and only secondarily on means of pursuing avocational interests. Informal learning is the least understood of the three learning strategies and should receive more detailed attention. Avocational learning encompasses all three learning strategies, and thus brings in a very different mix of issues than does informal learning.

SOCIAL CHANGES AND THEIR CONSEQUENCES

Policy makers must make decisions in the context of major social, cultural, technological, educational, and demographic changes. The desires, interests, and needs for lifelong learning by the citizenry need to be seen in the context of these changes and demands in order to frame the sorts of data that might be helpful to policy makers.

Evidence abounds that it is imperative that citizens continue their education far beyond their years in formal education. Pressures stem from the facts that people now have available to them a staggering amount of information, that there are continually evolving societal expectations and demands, and that individuals also have a panoply of internal motivations for continued education. The pubic is challenged today to know more and more about a broad range of disciplines, and it has more time than previously to pursue learning for enjoyment (avocational learning). This section identifies some of the forces driving change.

The calls for increasing the general *public's understanding* of science, math, history, the arts, political science, medicine, and other disciplines are in response to the accelerating pace of change in knowledge and the growing amount of information available. Considerable attention, for example, has been given to the public understanding of science. Science as a way of thought, a tool, and as an expanding body of information, has grown in importance in the latter half of the 20th Century. There seems little doubt that this will continue in the 21st Century. In addition, citizens are being asked to participate more and more in decisions that involve their communities. The concept of the *sustainability of communities*[1] rests on the idea of increasing the engagement of citizens in sustaining both the quality of community life and the health of local environments. Furthermore, analysts give considerable attention to the role of the *family as a learning unit.* Adults and parents are seeking ways to have multigenerational learning experiences. We are also beginning to understand better the adult *public's use of leisure time* and how much of non-work time is devoted to activities that are educational as well as entertaining. People are living longer and retiring earlier, and thus they have *more non-work years* in which to pursue personal interests that are enriched and made more enjoyable with a broadened underpinning of education.

Building on the considerable body of information about how adults learn (i.e., the field identified as andragogy, a term coined by Knowles (1981)), we are also learning more about the *process of learning* itself. Neurophysiologists, molecular geneticists, cognitive psychologists, among other scientists, are making important discoveries about how the brain works and the nature of human learning, cognition, and intelligence. Educators contribute to this increased understanding through their research about learning in the classroom. The social and cultural influences on learning are now understood better, and the complexity of learning is being explored by important researchers such as Howard Gardner, Professor of Education at the Harvard Graduate School of Education. Gardner suggests that people learn, remember, perform, and understand in different ways. This idea is developed in his books *Frames of Mind: the Theory of Multiple Intelligences (1985)* and *Multiple Intelligences: The Theory in Practice* (1993), and in subsequent writings. Researchers are coming to realize that females and males learn differently, a perception based on the notion of sexual dimorphism of the human brain. Analysis also emphasize that learning involves comprehending small bits of things at a time and scaffolding new information onto existing information. Learning also involves practice and repetition, and researchers have demonstrated that the social and physical setting influences the nature of learning.

These changes and advances in our understanding of the human intellect and culture help us to see that important learning can and does takes place in settings other than the formal education arena. Further, the importance of out-of-school education is coming to be recognized by mainstream educators, not just those who have traditionally worked in schools. More educators are perceiving the importance of the complementary and continuous nature of formal, non-formal, and informal learning strategies.

Thus we see that there are both societal and personal forces driving individuals in their quest for continued knowledge. It is certainly incorrect to assume that all learning, especially literacy as defined in the 1991 National Adult

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[1] *Sustainable Communities Review*, University of North Texas, Denton, TX (ISSN 1094-835X).

Literacy Act[1], is associated only with the formal education years. Learning begins before one starts and continues after one departs from an institution of formal education, and it is now essential that adults continue their learning well beyond the formal education years. All citizens do continue to learn; some do it quite aggressively, others less so.

The Informal Learning Infrastructure

To ascertain what facts, trends, and other issues are important for policy makers to know concerning adults' informal and avocational learning, it is important to look at the entire educational infrastructure, not just individual elements. The infrastructure can be analyzed from the perspective of community leaders, educators, and the learners themselves. Community leaders can examine the mix of informal and avocational learning opportunities and decide whether their communities offer a strong or weak mix (see Table 3). The degree of synergy among the relevant organizations can also be assessed. Educators can consider the relevancy of their programming to the interests and needs of the community and its citizens. Are there inviting opportunities for particular themes or topics, and are there special collaborative opportunities? Individuals can evaluate whether the community provides the kind of learning opportunities that are desired, and whether these are appropriate and accessible.

"Infrastructure" refers to the network of educational, social, and cultural resources that constitute the entire educational enterprise of a community. Those organizations that provide informal learning opportunities for avocational learning include: museums, zoos, botanical gardens and herbaria, aquaria, science centers, nature centers, libraries, community groups such as the YM/WCA system, Boys and Girls clubs, religious organizations, non-profit organizations such as horticultural groups, paraformal education groups such as the PTA, journalism and media organizations such as newspapers, magazines, and television, health services, universities, federal agencies such as the National Park Service, the National Institute of Health, and NASA, and scientific research centers/laboratories such as the Lowell Observatory in Flagstaff, Arizona. In addition, there are vast computerized resources for informal and avocational learning if one has access to the Internet.

Informal learning opportunities abound in many media: museum exhibits and programs, films, television programs, newspapers, CD-ROM-based activities, other computer-based programs and activities, books, commercially produced activity kits, ephemeral programs such as lectures and concerts, and so forth. The quality of the learning experiences in each medium can vary from quite mediocre to excellent.

Community leaders might ask the question, what are the accessible resources available to individual avocational learners in our community? Thinking in the broadest possible manner, they can analyze the constellation of informal learning resources available to members of their particular locale in order to determine if there is a rich and appropriate mix. Goals can be set and gaps filled. It might become the goal of the task force to suggest minimal sets of resources for communities to marshal in order to provide adequate opportunities for informal and avocational learning. Polling community leaders regarding their opinions about the availability of such resources and how extensively they are used would provide valuable information for developing an evaluation matrix permitting self-study by the various political units around the country.

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[1] "...an individual's ability to read, write, and speak in English, and compute and solve programs at levels of proficiency necessary to function on the job and in society, and to achieve one's goals and develop one knowledge's potential." Public Law 102-73, Sec 3.

Educators and policy makers might ask themselves what informal learning needs there are in this community. How can we best address those needs? What are the issues about accessibility—physical, cultural, and intellectual? Are the programs user-centered or staff-centered? Do the programs that exist address the needs of the informal and the avocational learner? What resources are available to pay for the materials? Similar questions will arise in all the respective neighborhoods, towns, and cities involved.

An individual learner might ask the questions, what are the resources in my community where I can pursue learning that I choose and that interests me? How far will I have to travel and how much will it cost me?

It is also useful to examine the degree of synergy that exists at an organizational level among boards of directors and management of local institutions, as well as looking at the interrelationships forged by an individual learner. What kinds of partnership programs exist or could be developed? Are themes identified for consortium members to develop each in his or her own way? Are there relationships between visits to a museum and subsequent visits to a library or to watching a particular television presentation? Is support needed to promote collaborations among institutions, and where might this support originate?

Table 3. A Means for Assessing a Community's Informal and Avocational Learning Opportunities: A Schematic Self-Study Matrix.

Program and Institution Sources	Accessibility	Social/Solitary Learning Activities	Breadth of Public Served	Learning Strategies	Sources of Income	Quality of Programs	Organizational and Program Synergy
Museums **Libraries** **Community organizations (can be specifically identified by each community)** **Internet** **Television & radio** **Religious groups** **Federal agencies** **State agencies** **Extension service** **Universities and community colleges** **Newspapers and other printed or electronic media**	*What activities are accessible in terms of the distance from the residence, and whether the activity is physically, culturally, economically accessible?*	*Do the activities serve a broad range of learning styles and social groupings, such as families?*	*Do activities serve individuals of all ages, sexes, socio-economic levels, geographic areas, and those who are considered traditionally underserved?*	*Are all three strategies (informal, nonformal, and formal) represented in a proportion that serves the community well?*	*Are all potential sources of income being tapped? (foundations; corporations; local, state, and federal governments; earned income; program fees; etc.)*	*Are programs serving the needs of the citizens? Is there a mechanism to assess the impact of programs?*	*Do institutions (trustees and staff) and learners make connections among the various resources available in a community?*

The range of the types of organizations and institutions offering informal learning activities has increased greatly over the last ten to fifteen years. As a result, communities and their citizens are now better served than ever with informal learning activities of higher quality. The results have been dramatic, as millions of adults and families have responded positively, attending museum exhibits, watching educational television programming, and purchasing program-related publications, games, toys, and the like. At the same time, for-profit businesses have moved aggressively into this field of "edutainment," significantly increasing the educational component of many of their goods and services. The explosive expansion of the computer into the home as well as into the school has made it possible for many lifelong learners, young and old, to explore, to learn, and to have fun through "edutainment" software. The public has also found rising educational content in the offerings of for-profit theme parks such as those of the Disney Company and Universal Studios. Collectively these changes have revolutionized the landscape of learning and education, and nowhere is this truer than in the United States.

TRENDS

This section identifies some research and social trends that should be taken into account when considering critical issues in the area of informal and avocational learning.

Adults as Learners. We are learning more about how adults learn. This has been well studied by Knox, Knowles, Tough, and others.[1] In brief, researchers have found that adults prefer:

- learning relative to a defined need,
- taking an active part in the teaching-learning process,
- a problem-centered rather than discipline or topic-centered learning approach, and
- a learning environment that is comfortable, cooperative, noncompetitive, and nonevaluative (Hiemstra 1981).

These preferences apply whether the adults are learning independently or in groups. Lifelong learning advocates say that the learning process is different for adults than for children. Adults have more knowledge, and if the learning is occurring in a group, knowledge is distributed among the group's members. If the adults are exploring a topic or problem, "the definitive answer" may not necessarily exist. Group discussions, such as those that might take place around the dinner table, during a coffee break at work, at the senior center or museum, or even on the basketball court, all have the potential to be opportunities where knowledge is created and constructed by a community of mutual learners. This diversity of knowledge of the participants offers an opportunity for creativity. "Having different viewpoints helps one discover alternatives and uncover tacit aspects of the problems with which one has to cope." (Fischer et al. 1998, p. 7). Informal learning, as a learning strategy, is a promising and rewarding approach, given what is known about how adults learn.

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[1] See the reference section.

But it is also recognized that not all adult learning styles are the same. The research of Roger Hiemstra (1981) shows that there are at least two cognitive learning styles. He uses the terms field-independent learners and field-dependent learners. Unmediated informal learning, for example, works well for those individuals who are field-independent learners as opposed to field-dependent learners. Field-dependent learners require substantial structure and guidance in their learning activities. They like to be guided and directed because they find it difficult to create their own structure for the learning experience. Field-independent learners, conversely, can build their own structure into a learning experience and thus operate more freely. It is therefore important to have insight into the learner as well as into educational strategies in order to have a realistic picture for the development of policy. Nonformal learning might be the strategy of choice for an avocational field-dependent learner, whereas informal learning might be the strategy of choice for an avocational field-independent learner. A developer of informal learning activities will also want to consider the degree of structure that will be needed by learners using the activity.

Research on Discourse. Based on the research carried out by educators and psychologists, we are learning more about how learning is accomplished through discourse (conversation). Researchers are able to identify the specifics in conversation that give it its power in the process of learning. Conversation, they note, is a socially mediated process by which knowledge is constructed and through which new knowledge is appropriated. Conversations are important means through which past experience is incorporated into current activity, and a way in which current experiences are carried forward to shape future activity (Leinhardt and Crowley 1998) The family as a learning unit is one specific subset of this investigation. In this research "family" is defined broadly to include the many types and combinations of family members. This research is helping to elucidate the differences between individuals learning as part of a group and solitary learning. Intensive research is being conducted by the Philadelphia/Camden Informal Science Education Collaborative (PISEC). They have demonstrated three levels of learning associated with specific categories of verbal behavior; 1) identifying, 2) describing, 3) interpreting and applying. Echoing Bloom's Taxonomy, family conversations include personal or family associations and other personal connections that, it is said, are the essence of family learning (Borun et al. 1998).

Beyond the Usual Suspects. The interest in informal and avocational learning programs is spreading. A broad array of businesses and organizations beyond the traditional ones (museums, community-based organizations, media, etc.) are developing informal learning programs and encouraging the process of informal learning.

- **The For-Profit Sector:** The for-profit world is blending entertainment with learning and thereby producing what can be called edutainment. Shopping malls and commercial entertainment malls are now inserting educational activities (similar to children's discovery centers and playrooms, zoos and aquaria) and family learning areas among the commercial shops, food courts, and various entertainment media. This is a powerful testimonial to the growth of demand for such learning. Entertainment corporations, including WonderWorks, large format films such as IMAX, and Disney (the best known of all) are "borrowing" ideas from traditional informal learning centers because they feel the evidence is sound that this type of learning experience attracts people. Most recently (April, 1998) Disney's Animal Kingdom opened in Florida, melding education with entertainment. As noted by West (1998) "the appearance of Disney's Animal Kingdom is of considerable importance to the informal science world, as it wants to be overtly educational and has the expressed intention of 'immerse(ing) people deep inside an animal environment' in the words of executive designer Joe Rohde." Informal learning has an undeniable power that gives it a presence in the demanding and high-stakes world of commercial real estate development. One only needs to look at the enormous entertainment centers such as those clustered around Orlando, Florida and in Southern California.

- **The Workplace:** Informal learning is also becoming an important contributing element in adult learning in the workplace. This underscores how difficult it is to draw rigid lines between the various strategies of learning and the motivations for learning. At present, conversation between workers is as likely as formal education to lead to improved knowledge, skills, and abilities for workers' professional interests as well as their avocational ones. As Watkins and Marsick (1992) have noted, "Organizations today are seeking new ways to understand and deliver learning outside the classroom. This trend is called by many names, for example, learning from experience, learning by doing, continuous learning for continuous improvement, accidental or incidental learning, self-managed learning, or the learning organization. We call it informal and incidental learning The reasons for this trend are many, but it is in large part fueled by radical changes in the global market-place that have pushed many organizations to work, organize, think and learn in very different ways. Technology is one of the key forces behind these changes…."(p. 287). Corporate studies have shown that about 20% of a manager's knowledge for the job comes from formal education whereas approximately 80% arises though job experiences and relationships with co-workers (Zemke 1985). Corporate leaders are introducing changes in the workplace to facilitate co-worker communication in a number of ways, including providing more times and places for employees to gather. Architects are becoming more involved as they design new corporate buildings to accommodate this trend. Continuous learning for continuous improvement is part of a cluster of new practices associated with Total Quality Management (TQM).

- **Higher Education:** Over the last quarter century colleges and universities have begun moving forcefully into informal learning activities. They are looking beyond the classroom and are supporting processes that encourage the building of communities of learners in different contexts including the home, school, and the workplace (Fisher 1998). In the early 1980s Allen (1981), noting changes in educational trends, said, "adult learning is the fastest growing part of education in this country today. Most of it is noncredit education. There are more people in continuing education programs than in universities and colleges... Universities are looking for new clients, new markets..." (p. 73). Universities have long offered continuing education programs, which are the traditional primary educational opportunities for avocational learners. But more recently they have also developed informal learning programs for the out-of-school, voluntary, self-directed learner. In some cases these programs are known as extension or outreach programs. Land grant and sea grant colleges both have public education programming components connected with their missions, and we see these being developed in new and creative ways. But this trend is going beyond these two clusters. Faculty are being encouraged to become more involved in community educational programs. Those who have specific areas of expertise and a desire to work with members of a community are becoming involved in a variety of ways from designing and developing programs and activities to participating in the transfer of knowledge. These activities may be web-based, community-based, media-based, or museum-based activities. The World Wide Web, for example, has created a new and challenging outlet for universities and their faculties to make informal learning opportunities available for learners other that their matriculated students. In addition, a number of disciplines are now adding the responsibility of community education to the list of obligations in their codes of professional ethics.[1]

Not only are colleges and universities sponsoring the development of programs for the out-of-school, voluntary, self-directed learner, there is an increasing trend to include the strategy of informal learning within the traditional formal education arena itself. University faculties are realizing that informal learning often plays a major role, particularly in the development of research teams, most notably at a graduate level. Because the integration of information across disciplines is required to reach new levels of understanding and create new technologies, multidisciplinary and interdisciplinary research requires a sharing of knowledge. Learning is no longer something that is done in solitary confinement! University faculty are also aware of the culture change in education that is required to move in this direction of group learning. There is ongoing research on learning in teams, including informal group discussions and new computer-based programs that facilitate individual/group decision making, work in formal game theory on collaboration and competition, and work in social and management science on team design and socialization of new team members (see, e.g., the University of Pittsburgh – Carnegie Mellon University Collaboration in Research in Learning).

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[1] One example is in the "Principles for the Conduct of Research in the Arctic" *Arctic Research of the United States*, 1992, Vol. 6, pp. 78-79. "Principle 4 – Research results should be explained in non-technical terms and, where feasible, should be communicated by means of study materials that can be used by local teachers or displays that can be shown in local community centers or museums." Another example comes from Society of American Archaeology's Principles of Archaeological Ethics adopted in April, 1996. The URL is http://sscf.uscb.edu/SAABulletin/14.3/SAA9.html. "Principle 4: Public Education and Outreach. Archaeologists should reach out to, and participate in cooperative efforts with others interested in the archaeological record with the aim of improving the preservation, protection, and interpretation of the record. In particular, archaeologists should undertake to: 1) enlist public support for the stewardship of the archaeological record; 2) explain and promote the use of archaeological methods and techniques in understanding human behavior and culture; and 3) communicate archaeological interpretations of the past. Many publics exist for archaeology including students and teachers; Native Americans and other ethnic, religious, and cultural groups who find in the archaeological record important aspects of their cultural heritage; lawmakers and government officials; reporters, journalists, and others involved in the media; and the general public. Archaeologists who are unable to undertake public education and outreach directly should encourage and support the efforts of others in these activities."

Ubiquitous Technology. Every day more people than ever have access to computers and are using them to pursue avocational interests. There is much to be explored in this area and at the current time there are more questions than answers. The nature of the questions are:

- Technical: what kinds of technology are available and what is the public's ability to use them? Do all sectors of our society and all adult learners have equal access to these resources?
- Learner-focused: what are the needs and interests of the learner and what activities are available to address those needs and interests?
- Developer focused: what are the characteristics of successful web-based or computer CD-ROM activities and how does one evaluate the impact of these programs? How does one integrate learning in this medium to learning opportunities available to the informal and avocational learner?
- Political: how can access be provided without subjecting children to inappropriate or harmful Internet materials? This is a thorny question for schools and libraries.

Active Citizen Participation. There are a number of avenues available to informal and avocational learners to pursue their interests that, in part, result from opportunities opened up by integrated technologies, including the computer and the World Wide Web. In each case, the learner becomes an active participant in real research or practical issues that affect the community. Four examples illustrate the possibilities:

- **Cornell Laboratory of Ornithology (CLO):** As noted in their web page http://birds.cornell.edu/CITSCI/index.html, "the history of ornithology is replete with the contributions of amateurs." Building on this base, CLO has organized a section in their education department for "Citizen Science." These are scientist–amateur partnerships that benefit both sides of the partnership equally. The scientists get a much larger body of data than would be possible otherwise, and the avocational learners expand their knowledge, skills, and abilities with regard to ornithology.
- **University of Colorado, Boulder:** The Center for LifeLong Learning and Design proposes the concept of Citizen Corners. These are envisioned as a network of sites in public places such as libraries and other community centers and in communities from large to small. They will provide an opportunity for informal and avocational learners to become more involved in the resolution of practical questions for their communities. One example cited is the involvement of citizen participation in a regional issue of how best to allocate bus routes. Making practical decisions addressing real concerns brings much to light.
- **Carnegie Mellon University (CMU):** An enormous amount of data exists as a result of computer technology. Data-mining is the field of study that explores how these data can be used. CMU's Center for Automated Learning and Discovery is a formal education program that explores new computer methods that use historical data to improve future decisions. It is easy to see how this idea can be adapted to the needs and interests of the informal and avocational learner. What databases exist that can be mined by the avocational learner, and what interfaces will be required to facilitate this activity?

- **Earthwatch:** The Earthwatch Institute is an international nonprofit organization that supports scientific field research worldwide through volunteers and scientists working together. Their mission is to build a sustainable world through an active partnership between scientists and citizens. The citizens, who participate in Earthwatch activities, are avocational learners and much of the learning is self-directed.

Impact and Quality Assessment

Anticipating the impact of the Government Performance and Results Act (GPRA) for federal agencies and beyond, it is appropriate to consider data that can be collected to aid not only policy makers but the organizations and individuals who offer informal and avocational learning programs. GPRA defines output and outcome goals. Output goals are defined as the level of effort that will be produced by a given date or time. It is generally thought these will be quantitative data, but it is recognized that citing numbers as evidence of impact is only one method. GPRA must go beyond that. Outcome goals are the identification of the intended results, effect, or consequences that will occur from carrying out a program. Another element of GPRA is program evaluation. This is assessment by means of objective measurement and systematic analysis of the manner and extent to which a program achieves intended objectives. Thus, GPRA is introducing a systematic method which people can use in establishing and learning from ongoing assessment programs.

The evaluation and assessment of formal education is considerably different from informal education. The latter is quite complex because of the nature of informal learning. In spite of that, there is a substantial body of literature regarding the evaluation of informal learning experiences. The literature is generally activity specific; evaluation reports are available for museum exhibits, Girl-Scout programs, television and radio programs, and interactive computer-based learning activities, for example. Due to the nature of informal learning, it is not possible to test cognitive change with a pre-post test activity. The goals of informal learning include the transmission of knowledge, including general literacy, but it is also about cultivating and fostering learners' long-term interests and passions that lead to an excitement about learning and stimulate further motivation for learning. Informal learning also helps to build the capacity for further learning by increasing the learner's confidence, changing misconceptions, and developing habits of mind.

The above reflects the perspective of the activity developer, program supporters, and community leaders perspective. Program impact and evaluation can also be considered from the learners. We need to learn more about the adult's perception of quality informal learning experiences. Questions can be asked that link the need to learn with the motivation for learning, the opinion of the learner regarding the helpfulness of the materials, and the perceived cognitive, affective, or psychomotor changes. Adult learners can be surveyed to see if their actions reflect what the theorists have said about adult learners.

Another level of the assessment question is how a self-directed learner assesses his/her informal learning performance. Fisher et al. (1998) have explored the idea of self-assessment. In this approach, the learners develop criteria to assess their overall performance. Because self-assessment is a process missing in our traditional formal educational system, it is something that must be introduced into the culture of informal learners if it is going to be effective. Self-evaluation, according to the Fisher group, is a fundamental concept behind self-directed learning.

Cost Effectiveness

Informal learning is a cost-effective form of education. For a number of independent learning activities, the major costs are front-loaded. The development of materials, exhibits, films, videos, CD-ROMs, or other materials may involve considerable sums in terms of personnel and materials, but once the activity is developed and evaluated it becomes self-sustaining. There may be subsequent mass production costs, promotional costs, dissemination costs, and parts replacement costs, but because the role of a mediator is reduced or totally eliminated there are no major ongoing personnel costs. The per-learner costs are relatively small when compared to formal education. Formal education is more expensive per learner due to the high costs of personnel and the highly developed infrastructure that includes physical plants and other overhead costs. Informal learning can also be made cost effective by large-scale dissemination of the learning activities. Television programs, though expensive, can reach millions of people, so, again, the per-unit cost is relatively small. Policy makers would be well served by knowing more about the financial needs of groups developing informal programs and programs for avocational learners. What is the nature of the need and what is the scope of the need?

Relationship between General Public Literacy and Avocational Learning

Although the idea of general literacy is being considered by another of the current task force sections, it is included here is to highlight the notion that educators see a relationship between the public's level of understanding of science, art, humanities, technology, etc. and informal and avocational learning. Much attention has been focused on the public's understanding of science but it is appropriate to generalize this to the public's understanding of a broad range of disciplines.

"Informal science [learning] can now be shown to be one of the important and indeed vital referents of scientific literacy" (Maarschalk 1988, p.139). He argues that one characteristic of a scientifically literate person is that such a person extends science education throughout life. More specifically, Maarschalk says "A scientifically literate person's hierarchy of values as manifested in his cognitive preference will be such that he will frequently partake in informal science teaching. He will not only spontaneously engage in scientific dialogue, thinking, and wonder but also spontaneously be on the lookout for scientific endeavors. This will be reflected in what his reading, viewing, and listening habits are and also in his hobbies and social life"(p. 139). A scientifically literate person wants to do and actually does something of a scientific nature. Miller and Kimmel (1998) discuss general patterns of information acquisition of out-of-school adults. Their work shows the broad range of sources and institutions that are tapped for the acquisition of scientific and technical information, but it seems that television and newspaper are the primary sources.

Awards

Award programs can stimulate activity and excellence in any given endeavor. There are a number of media and film award programs and individual award programs. There are a few very focused award programs sponsored by professional organizations in areas such as exhibit development (offered by the American Association of Museums) and school-museum collaborations (offered by the Association of Science-Technology Centers.) Awards are given for excellence in web sites, and individual professional societies such as the American Association for the Advancement of Science (AAAS) and the Society for American Archaeology (SAA) give awards for public education and public service. The SAA also has an annual award that is presented to an amateur (avocational) archaeologist. The American Historical Association (AHA) has an award for outstanding interpretations of history through the medium of film or video. It would be useful to identify and evaluate existing award programs in order to determine whether an award program stimulates the development of excellence in informal learning. What sorts of award programs are most effective in stimulating activity in this area? What criteria are used to determine the informal learning effectiveness of the programs? Are there award programs for outstanding vocational learning activities?

Professionalization of Informal and Avocational Educators

As noted above, there is no single organization or independently defined profession for those who consider themselves informal learning educators and program developers. There is also no educational curriculum, credential, professional organization, or journal that promotes the professional identity of those in informal education. College courses do exist for those wanting to specialize in lifelong learning, and universities have established research and learning centers to addresses this interest. But if present at all, the perspective of informal and avocational learning is a minor perspective in these programs. Does informal learning deserve a higher profile and separate identity? Alan Friedman, director of the New York Hall of Science, would say yes (Friedman 1995). He argues forcibly for an academic home for informal learning that would create and carry out a vigorous research and education agenda in informal learning. A policy issue to consider is whether enough others agree, and to determine whether moving in that direction will strengthen the field. Data can be gathered to provide a broad-based understanding for recommendations that might come from this idea. Three areas to look at are:

- Degree programs: undergraduate and graduate
- Professional meetings: as part of other organizational meetings or a stand alone meeting.
- Publications: Some current journals that contribute to a literature base in this area include: *American Demographics, American Sociological Review, Economic Geography, Education Theory, Journal of Interpretation Research, Journal of Leisure Research, Journal of Marriage and the Family, Leisure Sciences, The*

Informal Science Education Review, The Pubic Understanding of Science, and *Visitor Studies Today!*

One of the few books that focuses specifically on informal learning is *Informal Science Learning: What the Research says about Television, Science Museums, and Community-Based Projects.* Other books that address the use of leisure time and learning in museums are *Leisure Decisions Influencing African American Use of Museums* and *The Museum Experience.*

SUMMARY

The scope of informal and avocational learning is broad. Informal learning, as part of adult learning theory and practice, is receiving considerable attention in the professional literature and is being recognized as an important learning strategy. Numerous social, cultural, and technological changes are driving the need for continuing education beyond the formal education years. Avocational interests are one important stimulus for adults to continue their education and, as has been noted here, adults may choose formal, nonformal, or informal learning strategies to satisfy their needs. The types of organizations offering informal learning opportunities are varied; the quantities of materials available to informal learners are vast; and the media delivering educational activities are extensive. Further, there is an increased understanding of the relationship between informal and avocational learning and general literacy. Policy makers and individual learners have much to gain by sharpening the focus on informal learning and its impact in the lives of adults.

In some cases it is difficult to draw the line between research and evaluation questions that need to be addressed to achieve greater understanding of the informal learning process and to determine the statistical data that will help policy makers ensure that adults have access to the education and training needed to be successful in their work, family, and personal lives. Obviously, research in this area should be viewed as a high priority. But valuable statistical data can provide a national picture of the breadth of programming available, an understanding of a community's mix and synergism of informal and avocational learning activities, and an accurate understanding of the accessibility of the resources that adults need to pursue their educational interests.

Although relevant data exist, there are obvious gaps. One of the more important omissions is that the data have not been gathered with informal learning as the focus. The vast amount of data about libraries that is gathered in the NCES Public Library Survey, for example, includes information about such things as circulation, financial statistics, size of collection, program attendance, service measures, etc. but data from the user perspective are absent. The University of Minnesota Center for Survey Research and the Gallup Organization completed an example of a different type of study in 1993 (D'Elia 1993). It focused on the importance of libraries for the citizens of individual communities. Eighty-five percent of the 1,001 respondents said that the role of the community library as a "learning center for adult independent learners" was "very important" (other choices offered were "not important," "slightly important," and "moderately important.") This role was second in importance to "an educational support center for students of all ages" (88%). This example illustrates the need for more detailed information about the ways in which a library serves as a resource for the self-directed learner in terms of services used (programs, access to Internet, books and periodicals, etc.) and the nature of information desired (technical, literary, historical, etc.). Data could also be gathered to reveal how the user integrates various resources in the process of learning.

There are useful data in the National Household Education Survey (NHES) but, again, the focus isn't specifically on informal learning. What is needed, for example, are data on those behaviors and activities that are indicative of informal and avocational learning. Further, it is vital that the data reflect all sectors of adult learners in our society. Data also need to be collected from various perspectives, as noted below, in order to provide the most complete insight into the issues involved in understanding the role of informal and avocational learning among our nation's citizens:

- from the individual's perspective, to understand learners' needs, choice of activities, and integration of resources;
- from developers of informal learning material, to understand their priorities and skills at developing self-paced learning materials. It is highly likely that materials developers also have considerable understanding of the informal learning process; and,
- from policy makers and directors of organizations that offer these learning activities, to understand the motivations for organizations to provide informal learning facilities as well as costs, priorities, nature of the services, and the degree of synergy that exists among a community's set of resources.

RECOMMENDATIONS

Policy makers and materials developers need to understand the public's use of leisure time. Avocational and informal learning are two important uses of leisure time. Although individual research reports and the results of limited and targeted surveys do exist, they emphasize the need for a large up-to-date database (that consolidates this information, collected by means of a national survey). Such a database would have considerable utility to a variety of people. An appropriately constructed survey would provide insight about what people in general do as they engage in what they categorize as leisure-time activities, how much time they devote to leisure activities, and what they consider the activities that compete for their informal and avocational learning time, as well as the details of choices regarding what they define as educational activities. It is essential that data be gathered from a large sample of individuals representing a vast array of demographic and psychosocial variables. A general criticism of existing data is that they do not adequately address the ethnic and cross- cultural aspects of adult learning.

Existing surveys do not adequately address the needs of policy makers and others because the relevant questions are not being asked. Relevant questions are those that will probe motivations and document behavior and activities. This cannot be done successfully without the development of a clear and comprehensive definition of informal and avocational learning. Educators have defined learning, but do informal and avocational learners use the same definition if asked how many hours a week they spend learning? Survey and questionnaire developers and the respondents need to be of one mind regarding the breadth of motivations and activities that can be subsumed under the concept of informal learning. Motivational questions will get at why people want to learn and what is it they want to learn. Examples of such questions that might be asked are:

- Why are you engaged in this activity? Will this lead to specific knowledge that will help solve a problem (goal-oriented learning), or does it involve social interaction (activities-oriented learners), or does it lead to new information and understanding (learning-oriented.) (These three categories are based on Houle 1961).
- What is it that interests you about this activity?
- How long do you intend to spend involved with this activity?
- How does this activity fit with other things that you do?

Moreover, these questions will lead to greater understanding about the motivations for informal learning and the interest in learning specific subjects, the degree to which avocational and informal learning is problem-focused, as many theorists in andragogy would suggest, and the relationship between general literacy levels and the development of disciplinary knowledge standards such as we have seen in math, science, history, etc.

Closely related to motivation for learning is the choice of informal and avocational learning activities. Disparate data exist providing information about what journals and newspapers are read, what television programs are watched, and what radio programs are listened to, but this has not been used in a manner that gives insight into whether people view these activities as avocational or informal learning. A good example of this comes from a 1992 Washington Post survey of the use of leisure time (Falk 1993). Researchers were interested in what people did during leisure time; respondents cited such activities as reading a book, working on a hobby, going to a museum or art galley, renting a video, among others. All these could be considered informal learning activities but the question was not asked in a manner that probed the motivations for the activities, so one cannot determine if these were considered learning activities.

Few data currently exist on the impact of recent technological advances in informal and avocational learning. Who has access to computer-based activities and how are advanced technologies being used in informal learning? What kinds of computer-based activities are preferred? Considerable data exist regarding adults' uses of museums. We know what museums are visited, how frequently they are visited, and many other demographic data regarding users of museums, but we do not know whether or to what extent these visits are viewed as learning experiences or how often a museum is selected specifically as the medium for self-directed learning. Do adults visit museums to learn something specific or do they simply hope or assume that one of the byproducts of visiting a museum will be learning? What other resources are considered sources for learning? Do theme parks really compete as informal learning venues?

Another major gap exists in tracking the interrelationship of these activities. Does one activity lead to another? For example, does seeing a film about Shakespeare stimulate an individual to learn more about Shakespeare by purchasing a book, getting books from the library, going to a theatrical performance of a Shakespeare play, or engaging in a conversation with others about Shakespeare?

Behaviors that can be identified as indicators of self-directed, informal, and avocational learning include: purchasing and playing games, reading books and magazines, watching films, videos and/or television, listening to the radio, using a computer, going to a library, visiting museums of all types, attending dramatic and/or musical theater, building models, talking with friends and relatives, conversations with people that have similar interests, and participating in community activities, to identify only a few. Behaviors may vary from the more easily observed participatory hands-on or group involvement/social learning activities to the more solitary, cerebral, contemplative activities.

There is considerable concern over the breadth and depth of accessibility to informal and avocational learning activities. Is it true that there is a growing gap, as some would suggest, between "haves" and "have-nots" in terms of access to advanced technologies? A large data base that shows trends regarding socio-economic status and other demographic variables, correlated with location of residence (e.g., urban vs. rural), educational levels and other measures of nearness of resources, and the cost of informal and avocational learning programs and activities would help policy makers understand the details of what is available and to whom.

Users and potential users may perceive that other obstacles stand in the way of their accessing informal and avocational learning resources and opportunities. The identification of specific obstacles will help materials developers, organizations, and policy makers determine ways to overcome the obstacles. In addition to ones that can be explained by cost, do obstacles appear due to physical inaccessibility, culturally related issues, language barriers, sex-related biases, etc.? We need to investigate more actively the attitudes and perceived needs of the "customers" or learner. Developers and community leaders need to do more of what is called in the business world "listening to the customer" or take what is termed in the education world a "learner centered" approach.

Since the Internet is a relatively new and very powerful resource, giving particular attention to issues related to informal and avocational learning via the World Wide Web seems most appropriate. How many people have access to Internet resources? How do people find out about these resources? Where do people go to get access to these resources if they do not have them at home? What are considered good World Wide Web learning sites and why? How do people describe a web-based learning experience? How long is a meaningful time on task to produce effective learning results? Does web-based learning promote the learner's confidence? Do the other features that have been identified as key to adult life-long learning apply in this environment?

We need a more systematic understanding of what constitutes well-designed informal learning and avocational learning activities, programs, and resources. Adult learners can be polled regarding their opinion of well-designed activities. Also, developers and other leaders can provide insight into their opinions about the impact of their programs and activities. From this, one can gather information about the criteria that have been used to assess the quality of informal learning activities and move toward a more sophisticated and systematic general understanding of this type of learning.

A survey can be structured to get at the requirements of the educational and community infrastructure that is required to promote lifelong learning – especially avocational and informal learning. Who provides financial support for informal and avocational learning? How diverse is the programming in a given community? What academic programs exist for the education of practitioners in this area? How do institutions of formal education and organizations involved in informal and avocational learning work together? How does one stimulate the passion for self-directed/informal learning during the formal education years?

Extracting from the previous sections, there are a number of specific questions that need to be addressed via national surveys. Below are some examples:

- What needs (societal/personal) are driving the increased emphasis on informal learning? What kinds of responses should there be to these needs: at the community level, at the state level, at the national level?
- What means are used by adults to pursue avocational interests? Is there a need for more nonformal courses, distance learning, computer-assisted instruction, or other asynchronous learning opportunities?
- What are the content areas in which adults seek additional personal learning?
- What are the barriers to resource accessibility?
- What are the sources of funds available for supporting informal and avocational learning?
- Are academic programs needed for the education of practitioners in this area? Do any currently exist? How does one encourage self-directed learning during the formal education years?
- What is the importance of games, toys, and puzzles in informal learning? What games are used in this manner; how do games contribute to learners' confidence and abilities? What math and science concepts, for example, are built into games and crafts? An example of the latter is the mathematical underpinnings of quilting.
- What role do print and media journalists have to play in informal learning? Do journalists consider what is published an educational contribution? Is there a need for them to increase their awareness and understanding of informal and self-directed learning so that articles and publications are more "learner centered"?
- What are the most frequently accessed web sites? What is their appeal? What percentage of time spent on the Internet is categorized as informal or avocational learning by the individual?
- For a given period (week or month or year), how much time does an adult devote to activities considered informal learning; activities considered avocational, and considered vocational?
- What are model programs of informal learning? Which of these are exemplars of avocational learning activities? These can be sought from the vast materials that are available and the varied organizations that provide informal learning opportunities.
- What is the relationship between the role informal and avocational learning activities play in an individual's life and do these vary by education, gender, household income, ethnicity, and achievement in formal education, church attendance, etc.?

- What portion of learning projects are self-learning and what portion are group learning activities?
- How can policy makers tap the vast amount of information generated by the for-profit sector that relates to consumer demographics and choices made in purchasing games and toys, computer software, "edutainment" options, and commercial publishing?
- What awards and award programs exist that promote excellence in informal learning materials and programs?

A variety of techniques can be used for gathering data. Certainly the most common will be surveys and questionnaires. But other techniques can be used. For example, the diary log is effective to see relationships between actions. Individuals can be asked to record their daily activities for a given period of time in order to see what actions or motivations stimulate informal (self-directed) or avocational learning. One can also see how one action influences another. The other traditional mechanisms for gathering such data are interviews, observations, questionnaires, and surveys. Offering a new mechanism for data collections, surveys are now being posted on web sites. One interesting example can be found at http://www.infopeople.org/ipeval.html, which contains the "Public Internet Access Survey." This site asks public library users for information about their use of the Internet at the library.

There are, in short, a number of critical issues that can be explored to give a better sense of the present state and the future possibilities related to informal and avocational learning. The role of informal learning in the larger issue of life-long learning but is one of the most exciting ones in the entire field of education.

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Appendix D:
TRP List, Meeting Summary, and Background Report

NCES Lifelong Learning Task Force
Technical Review Panel • February 25, 1999, Washington, DC

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NCES Lifelong Learning Task Force
Technical Review Panel • Meeting Summary
February 25, 1999

Welcome (Gary Philips, Associate Commissioner, NCES)

Center has a history of evaluating itself.

One year ago concluded that we had a gap in LLL.

We need panel's help in setting priorities.

Some past inroads, 6 years ago, post-secondary assessment, $100,000 or more spent.

"NAEP goes to college," timing not right–feasible, but political issues.

External groups' [advice was?] controversial, contradictory, but useful.

We want advice to help get best info to public and policy makers.

Policy makers initially resist information but once they see it can't get enough of it.

NAEP at the State level, initially met lots of resistance, 10 years later 44 States want it, want more, $3 million to $40 million budget increase.

We are in a similar situation with LLL as we were with NAEP 10 years ago.

Given 20 million baby boomers, many questions to ask: How literate are adults, what are people learning in college, what factors determine or inhibit success.

We need your advice based on your expertise and opinion.

Task force will listen and NCES management will listen.

Introductions

Lisa Hudson, NCES.
Currently task force leader and vocational education data collection. In the past: DoD, ED (National Assessment of Vocational Education) and RAND.

John Comings, Director, National Center for the Study of Adult Learning and Literacy (NCSALL). Includes Portland State, U Tennessee, Rutgers and Harvard.
Developed literacy programs in Asia, achievement and retention of literacy skills.

Albert Tuijnman, Professor at Institute of International Education.
International Comparative Studies of Education, Lifelong Learning for All, OECD minister two years ago, ILSS

Marilyn Binkley, NCES.
International activities, literacy at all ages (NALS, ILSS), Literacy, information technology.

Mike Horrigan, Bureau of Labor Statistics, US Dept. of Labor
NLS-Y studies. Marriage, work, training, fertility etc. Includes census of all schools in PSU from which youth will be drawn from. Director of special research on training surveys; incidence survey in 1993, intensity of training in 1995.

Mark Milliron, Oracle Higher Education.
Community colleges, technology in learning and running college, study of teaching excellence. Oracle, administrative and educational instruction. Input to higher education, process, activities, and outcomes.

Laura Salganik, Deputy Director of Educational Statistics Service Institute (ESSI).
Staff of ESSI works with NCES. Worked at AIR and Pelavin, elementary and secondary education, international learning and skills

John Wirt, NCES.
Editor of Condition of Education, director of 2nd national assessment of vocational education, worked at RAND, Office of Technology Assessment, SCANS Commission.

Mary Frase, NCES.
Senior Technical Advisor, read everything, program director for NHES, representing Marty Orland (NCES Division Director for Task Force).

Kevin Dougherty, Community College Research Center at Columbia U.
Economic role of community colleges, planning, small business assistance, impact on trainees and firms.

Melissa Oppenheimer, Planning and Evaluation Services, ED.
Project officer, ESL, and adult basic for non-English speakers. Budget policy and legislative policy.

Nevzer Stacey, Office of Educational Research and Improvement, ED.
Bureaucrat, since HEW. Lifelong learning, financing of LLL in Stanford 1980, work sites. National Employer Survey, recommend "Competence without Credentials" (about to be published).

Larry Hirschorn, Center for Applied Research.
Higher education issues, interested in privatization, testing and credentials.

Doris Werwie, Office of Vocational and Adult Education, ED.
Vocational education research, sociology of work, past head of research at EEOC. Link in job skills and education and work.

Laurie Bassi, Georgetown U, VP at Amer. Society for Training & Development (ASTD).
ASTD focuses on education and training in business sector, 70,000 members, standards for measuring and evaluating investments in training.

Ellie Greenberg, Mountain and Plains Partnership (MAP), University of Colorado.
MAP has 16 partners. Past work at Northern Telecom and U.S. West, University Without Walls in 1970s. Adult learning, intellectual and ethical development.

Paula Knepper, NCES.
Worked at American Council on Education (ACE), policy research on higher education. At NCES, longitudinal studies—B&B (Baccalaureate and Beyond), BPS (Beginning Postsecondary Students).

Trudy Bers, Oakton Community College.
Illinois performance-based evaluation systems for community colleges. Go back to War on Poverty in Chicago.

Peter Stowe, NCES.
Varied work in NCES: NLS-72, High School and Beyond, NPSAS, RCG, NHES and adult education component, IPEDS, finance portion of IPEDS.

Cheryl Lovell, University of Denver.
Postsecondary public policy, state and federal relationships, college administration—retention of traditional college students. SHEEO and NCHEMS.

John Konstant, ESSI
Works on ILSS (International Life Skills Survey).

Shannon Blaney, ESSI
This is first project concerning lifelong learning.

SECTION 2: MONITORING AND TRENDS

Laurie Bassi:

Economist, takes supply and demand perspective.
Two kinds of consumers—enterprises and individual purchasers. The two marketplaces are related to each, what has been affecting their evolution?

Most of the trends have been on the demand side. Two major trends, globalization and technological innovation affect demand. We observe a significant increase in demand as return to physical capital has gone down, intellectual capital up. Employers are spending more on training (not less!), forces to spend more out-weigh forces to spend less.
Teamwork, information technology are driving demand from employers. Returns to individuals have meant that individuals are seeking more education.

Supply of LLL has been unaffected by technology, basically chalk and talk. This is starting to change, electronic delivery of instruction is only now beginning to affect supply. Potential exists for radical shift. Forces of supply not as well understood now.

General Discussion:

The aging population, environmental issues, non-direct economic gains should be addressed. Health consequences of an active mind.

The background paper focuses too much on wages. People not in economy, child providers, mother's education has effect on children. By focusing on adults in addition to school-aged children, can bring to light the educational needs of other segments of the population. E.g., Maricopa College was not meeting needs of older people, so they voted against education spending (they needed e-mail).

Focus on outcomes other than economic —quality of life outcomes, such as:
Technology usage and information skills (ability to gather info)
Skills in life and career planning
Personal finance skills
Health management skills
Balance family skills
Citizenship skills
In addition to strictly work-related skills

What are the goals, expected outcomes of learners? Within a survey, individuals' expected outcomes versus actual outcomes (better health, income).
At Community Colleges (CCs), graduation rates often not the goal, but end up being what CCs are evaluated on.
Need to ask goals directly, frequently—people change their focus.

Not all learning advances a job or pay—some is necessary to keep jobs—maintain jobs—keep skills equivalent/up-to-date—need to know about this as well (vs. learning skills for new job).

Complexity of world/decision-making in adult life—skills needed to deal with this to be effective parent, citizen. School environment is also changing, role of parent changes as schools changes (testing etc.) Just keeping up demands continuously increased skills.

Individuals led to CCs in search of work-related credentials are often attracted into more broadly based educational programs: Is the drive for expanded workforce skills leading more people to humanistic education? Will this lead people to better education?

Individuals go in and out of lifelong learning to acquire competencies. Measurement issue, something has happened to notion of learning, the linear system. A new system needs to be created to manage the various aspects of life. Need competency modules.

Changes driven by supply as well as demand. Colleges lost money, went looking for markets, found contract training—CCs got into contract training before market really emerged. States (Michigan) stimulated employers to demand training from CCs. This is a fundamental feature of the system from now on.

Learning is a function of the individual. Education is a function of the system. **Learner is our interest, so focus on learning.**

Ages and stages of life. Worker education fits into second trimester of life. Third trimester has a different focus.

CCs are into making money—continuing education (CE) used to make money. OK if the state does not have to pay, same for continuing medical continuing education. Since does not require public funds, is popular with schools and state agencies.

State, industry policy for CE is an issue. Requirements for CE are growing—to keep license (teachers, medicine, law).

DOE is primarily interested in the person (learner). Access and opportunity, look at who is paying to let market bear some cost. **Government ought to look for places where market fails to produce optimal outcome/investment**. Basic skills training will not be undertaken by employers.

ASTD says employers are paying more for training not less. Employers are now supporting MBA's—not blue-collar workers. **Are employers investing more or less than they used to in training of various sorts? Are they investing in different workers?**

We need data to answer who is supporting worker training. OECD (IALS) says number one supporter of training is employer, then individual/family. Found that government pays less than 10% of worker education and training in all countries.

To get funding people will say that it is employment-related training.

Our ability to measure supply has gotten worse. Need proper sampling frame, sample size to understand age breaks etc. To assess supply, need: measures of incidence, measures of intensity, measures of quality, input (individual), student teacher ratios, etc.

Measure barriers to —Barriers to acquire financing, etc.

Labor unions have bargained for education benefits, training activities—volume discount for pre-paid programs (not reimbursement). Training not necessarily job-related, and includes non-managerial personnel. Look at large employers (Communication Workers of America and Baby Bells) where unions likely to have effect.

Master narrative/Story of what is happening—
Restructuring of adult learning system. Our understanding of public policy was based on certain system, now have privatization, innovation. Education system being transformed.
What public policy is responsive to this new system of supply? What statistics should we gather to measure this new system of supply? **Equity issue critical as system changes.** Losers and gainers are not going to be the same.

Shift from unions to employers. But are employers offering narrower, short term training rather than long-term? Employer-provided training focuses on immediate tasks—skills very narrow, outdated quickly. What is the effect of substitution of training, is the quality of training changing. Quality is crucial, mean and variance both important in telling a story (look at more than just the aggregate). Employers picking up more of the burden, but less portable training.

What to measure in monitoring system? Input variables of learners, environmental variables (providers, process), outcome variables (what does learner do with knowledge/skills gained).

Learning is long-term. What short term proxies can be used to measure long-term outcomes?

Is training required by Law? (How do people get to training? Motivation issue)

Careful of choices in what you sample, stratify—oversampling. How do you stratify the workplace/labor market? What type of survey is best? Cross-sectional, repeated cross-sectional, longitudinal?

SECTION 3: SERVICE DELIVERY IN POSTSECONDARY AND OTHER INSTITUTIONS

Trudy Bers:

Do not lose sight of "other institutions" (e.g., local park district) in service delivery.
Slippage between potential units of analysis, must have clarity in units of analysis. (Also, census versus sample; recurring versus special studies.)
What are the policy issues—Data for describing or evaluating, be clear.
Focuses mostly on post-secondary institutions—Distance education *not* mentioned here, should be.
Over the counter commercial courses (e.g., CD-ROM), becoming more common and better.
This is all in technology section.
How does student document learning—career transcripts, portability issue.
Where (in what occupational fields) is CE required?
What do we do with the questions? What is the focus?
Do not slide into formal credit courses, this limits the measurement we do.
Differentiate between credit and non-credit, no firm definition at the margin.

General Discussion:

Definition of non-credit course: "A course where the enrollee could not count it towards financial aid".

What is the overall nature of what we are trying to wrestle with—how do we define and measure non-credit courses? Many education systems have no way to handle continuing education; data infrastructure for learning systems in US is terrible. Post-secondary institutions cannot tell how many non-credit courses are taught.

No mention of libraries, museums, book clubs (growth in clubs). Have to get information from individuals to get at non-credit, informal.

All data systems are biased towards straight-through students, finance, courses, administration, learning. No data on CE, data infrastructure for learning systems is terrible. Many colleges have a separate computer records system for CE.

Federal and State requirements drive data collections. Alternate view: institutional data collection people (institutions) are saying what they have and NCES accepts that.

Barriers—Adults in continuing education want convenience, do not want to give information, don't like paperwork, resistance to giving SSN and race.

Sometimes we know the universe list (universe needs to be re-structured), departments. You have the right unit, but they have different records. Keep a diary for 2 weeks to get information that is not readily at hand. Could we provide advance warning to institutions of data needed at certain point in time? (e.g., Labor told employers in advance they would want data over a two-week period)

"Other" institutions—we need to capture from the individual for the rarer type of events. Technology use too.

European Union, crossing borders becomes motivator for developing LLL passport. The learner is the documentor of their learning. Electronic form of LLL passport is not yet here. Schools do not document part-time learners. Have not realized the student is the driver. The state will not fund the individual if they know that students are taking courses for themselves rather than to get a credential. But Sylvan is already providing students with a system for documenting their information and work-related learning gains. With private sector taking charge, will there be a "learner smart card" to document learning?

Now is a time of feast—workplaces push for training and development because they need it (economy doing well, can't hire from outside). 1981-91 this was not the case, the state was funding all this. In famine, the workplace will not provide the education, the state must provide this funding (to train unemployed, and to re-train).

Concern that policymakers currently believe adults are fine so we need only fund traditional education. Need studies that measure public ability to use the information the Federal government is forcing on them (e.g., nutrition labels). If attention focuses on nontraditional students, will government abdicate responsibility to fund public institutions? Or try to regulate it? The other side to this is that the market should leave what is well enough alone, reallocate money to other areas. Why should government fund learning if business and industry can?

Kanter's study in Harvard Review of Education, businesses go where education is.

Need to know the learner's choice set. Also, what are people "buying" (credit hours, competencies, social networks, etc.)? Measurement of all the choice alternatives—if you cannot measure the alternatives, your model is wrong.

Choice set universe: postsecondary, Military, ETS, companies that offer IT training, etc.—need self-reports from the individual.

The demographics show aging, need to reduce social security burden—Thus, we should focus further on the third trimester of life, the older citizen should have increased priority. Want older people to be more productive, so not dependent earlier. There is tremendous burden on second trimester group to support the other two. The dependency ratio is growing less favorable, as growing numbers of elderly females and young immigrants need more services. What will happen to education and training if employers stop supporting education due to economic recession and/or retirement of Baby Boomers?

"Half-life of training"—learning becomes obsolete quickly.

Why more females than males participating (e.g., more undergrads are female). Young men seem to be making other choices (IT field, prison). **Must look at broader choice sets to understand people's decisions.**

State legislatures see a simplified choice set. They want to know that the state has a comprehensive post-secondary system, the "other" category could be endless. State legislators focus on universities, 2-year colleges, voc-tech.

Different demographic groups benefit from different choice sets (have different learning needs and goals). Thus, the providers may not be interchangeable. If one replaces another, it might affect access, equity. Quality dimension must be assessed as it intersects with type of student, student may need training but not education (or vice versa).

There is no education and training counseling for part-time/noncredit students—can lead to bad choices. Courses are not the substance, but larger issue of what one is doing is, coherence and cost-efficiency.

Division of Adult Education at OVAE has National Data Collection—
Focuses on defined outcome, increased literacy, GEDs, Post-secondary schools.
Federal data by age, gender, type of adult education program. Focused on Adult Education and Workforce Literacy Act. Pelavin doing data collection.

How do we measure success of students in reaching their goals? The goals of students vary so much, CCs suffer in four-year model. Need to examine by type of learner and type of institution.

Unit of analysis: individual, social network (common enterprise), institution.
Community of practice, characteristics of those communities.

SECTION 4: THE EDUCATION OF WORKERS

Larry Hirschorn:

The transformation of learning is going on throughout the system. LLL is part of the larger transformation of learning and education.
What will be the models of skill acquisition in adult life?
Is the IT sector going to be the model—Employers provide, testing institutions, certification, all of which reduces salience of degree granting sector.

National Center on Educational Quality, University of Pennsylvania: Amount, incidence, screening of employees etc.
Technology is removing the middleman in education, Manpower services also—
"Disintermediation" of educational institutions. Novell, Kelly, Manpower provide education for temps. Continuity of care, education.
Will all these trends create national standards of competency? Employers look at resume, education institution, do they like person. Will employers have a more objective basis for selection of employees, will this change location of training?
Amount of workplace training worker is getting going up? How is this being organized?

General Discussion:

There can be a bias against post-secondary education in industry (especially telecom), schools not looked at as meritorious. Training for current workforce and for employees who are about be downsized.
Research (NCRVE-Berkeley) Norton Grubb—Training and transition, training and retention. IT industry—they need to train workers, but then workers leave. Leads to focus on training *and* retention strategies. Richard Synnott, what is employees' loyalty when they work at home? (One strategy for retention)

Communication happens via technology, human communications skills needed to operationalize. Projection of skill needs for labor force as a whole? And, for workers at different points in their careers?

Widen discussion to learners? Use of the label "worker" versus "learner." Worker is one way to think about adult learner—also, unemployed, men, women, middle-aged women returning to work, older people trying to stay in the labor force. Worker is specific category, learner is broad category. Worker is too narrow in the broader context. Words are very important to define focus, agenda.

Albert is describing whole domain, our list is policy issues. Remember the same person is learner and worker. Monitoring system needs to define key characteristics of system, the questions posed are analytical, policy. Education of workers is just one slice. These take one way beyond a monitoring system.

The background paper lists very important policy issues, but too narrow, does not provide a comprehensive model of LLL system. Divides topics up piece-meal, leaves things out. Don't focus too much on policy issues, because they will change, are temporal. What are conceptual schemas for mapping the universe? Albert T. has written about this issue.

Avoid input-process-output model—too boring. NCES data has to be policy-relevant.

Different ways to construct/model monitoring system:

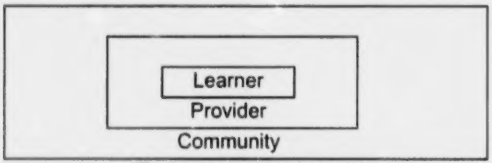
Learners as a whole—Workers
Learning Process—Basic Skills
Learning Content—Informal and Avocational
Learning Methods—New technologies
Learning Outcomes

We can tie ourselves into provider framework, but we are moving more to a market rather than a framework.

Lifecycle perspective, focused on skills is one option.

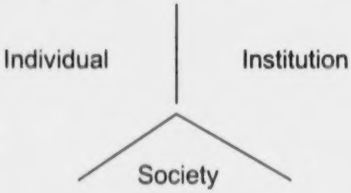
Community and society issues are ever more complex; institutions' and individuals' roles in society are changing. Assemble data on learners, employers, schools, community.

1990's students as customers. Now learning centered education, interaction between learner and provider to study process. Need learner-centered perspective. Learner is the end, others are means to the end. Systems surround the learner:



(Technology cuts through)

Other perspective (need to balance costs, benefits for each piece of the pie)



Focus on learning process (not learner). Individual X provider matrix rather than circles.

Indicators Panel, Education Counts (NCES publication that provides indicator system for monitoring education). Figure out conceptual map.

Ecology of institutions—everyone is in motion
Cycles of education—enrolled in college...
Industrial structure—how is value created, who gets more

Market for skill, what are the characteristics of that market? How does this change skills individuals need? Changes in education market lead to more consumer choice:
—test construction, test administration institutions
—employer certification/training vendors (e.g., Microsoft)
—Production of content (e.g., textbook companies)

Which will mesh with alternative systems of delivery?

All the new delivery systems are leading to skill transparency, decline of branding (e.g., degree from Harvard or Stanford better than proven competency). With increase in competency-based assessment, problems of accreditation and assessment need to be resolved. University of Phoenix has tracked problems with accreditation in different states, Kaplan has on-line Law School in California. These types of initiatives will become more common.

7 piece/kaleidoscope model for monitoring system:
Learner, motivation, deliverer of learning, purchaser or payer, setting in which it occurs, instructional methodology, learning outcome or achievement.
One piece stays central, and others circulate. We can focus in on any one of these.

Problem: We do not have a universe list for providers.

Analogy from NICHD: Health care, traditional model, usage statistics, formal vs. informal statistics. There are a lot of providers for childcare. How does behavior change as price changes? Need a universe list. BLS will take a limited set of sampling units, census all providers, choices available, prices, what are the decisions that people make.

Permanent Education, Recurrent Education, Lifelong Learning now:
a. about learner
b. capacity and motivation to learn (learning to learn)
c. How do you get at open, experiential learning?

Learner-centered approach: Capability, motivation to learn are critical

Questions addressed to employers about training needs may be highly unreliable? (Response bias) What they need and what they demand may be very different. How do employers determine skill needs?
Randall Collins, very little connection between jobs and credentials?
What did learner get out of training? This needs to be asked often? Learner may not immediately know how useful experience was (or was not)—takes time to discover how useful experience is. Measures of effectiveness based on student evaluations are contaminated by student motivation. Students who are highly motivated to learn or to attend courses are more likely to rate them as effective.

Impossible to predict skill needs. Steve Barley: need ethnographic studies to find *current* skill needs. It is difficult to measure job skills quantitatively. What are the job requirements in the economy that cannot be measured? Skill shortages are linked to employers' willingness to pay for skills.

Gap between academe's ability and willingness to respond to workforce needs, there is huge investment in curriculum, in a sense the curriculum is closed.
E.g., cannot get cultural diversity, ethnicity into the curriculum.

SECTION 5: ACQUISITION OF BASIC SKILLS

John Comings:

ABE has two categories: higher (NALS2) and lower (NALS1)
Very diverse population across ABE, ASE, ESL
Where do we get people to, standards being developed, Murnane and Levy (Basic Skills)
Need to re-define basic skills, basic skills have changed—but 3 Rs, English, and HS credential will always be important.
High school level is no longer sufficient, now people need college.
This is the foundation, the rest of lifelong learning is irrelevant if the basic skills are not there.
All the classes in Family, Work, corrections literacy look the same.
Motivation, participation, and persistence are key in this area of learning.
We can say that people would benefit, but most of those people think they do not need this training (70% of NALS level 1 say they read well or very well). What does it mean when NALS1 group says they don't need skills? Do they not recognize deficit, or recognize but accept it?
Events happen that change participants view so they walk in door to basic education—
Child, divorce, etc..
The decision is followed by dropout very quickly. But they need a lot of hours. We have to find out what is happening and how to keep people in the programs.

Service delivery: Teachers, students, cost. Market segmentation. We do not know much about teachers in these programs. This is a teacher and a group of students, not really a program, so **we need to collect data at the teacher level.**

Now, changes in welfare laws, welfare to work cuts down on training.
Correctional facility: people are busy, lots of anger, not ideal location for learning.

What are the skill demands and levels—definition and outcome are still not clear to experts. A lot of work needs to be done on assessment interviews.
We can develop measures of skills that can be collected through surveys.
Asking people about their health is the best predictive measure, there are some simpler ways we can measure skills.

General Discussion:

What proportion of the population could at NALS level 1 could be got to 9th grade?. The NALS1 group is 30% over 65, 15% vision problems, 30% non-English, 24% physical, emotional or social difficulties so they don't work. Getting those people up will be hard. NALS 2 can be raised to level three. Thousands of hours of instruction with better teachers is needed to get adults to level 3.

Why do other countries have lower proportions in NALS Level 1? Immigration, policies are factors.

One of the units of analysis has to be the international dimension, this poses different questions. Key parameters should have international benchmarks. **Need international comparison for key issues (broader perspective).** We need to ask about incidence and intensity (duration) internationally?

Are there areas in which we have some data but other areas where we have no data that are policy relevant?

Who wants to know—who are we providing data for? Congress? Many users—data useful for federal, state, and local policy makers, and for practitioners.

From a monitoring perspective, how sensible is it to focus on adult basic education? Some of same questions about adult secondary, adult tertiary level education?

One of the most significant challenges is with new immigrants, society is not addressing the needs of immigrants. Count immigrants, education level, English language, how well are they being provided for? Tend to be bifurcated group (high and low skill levels). But—ESL population is being disproportionately served—due to high levels of motivation.

Does this suggest statistical concerns? Independent controls, weighted controls to independent samples. To what extent are we confident that we have good measures, and to what extent do we have the right number of eligibles in the denominator?

Most under-served group (based on NALS)—not immigrants but African American males. This estimate is good? Yes, estimates come from NALS, IALS, and Census.

Who gets served versus who needs to be served. Who is eligible to be served?

The denominator is not good for level 1 people, current ability levels of immigrants on entry. Those are two different groups.

Hispanic population is not speaking English across generations, Hispanic minority is at the same time making great progress.

ESL students persist longer than ABE/ESL. First generation immigrants do better.

Additional feedback from Melissa Oppenheimer (via e-mail):

Need to know more about adult basic education service delivery system and the adults who are in it. Focus on basic descriptive info rather than on how to attract adults to system of questionable quality.

Rather than Q11, ask how programs place learners into classes and what diagnoses they do as part of that process. Need to know more about assessment in adult basic ed.
Also: How are classes offered—what are course schedules, do programs have set registration periods, or are they open-entry/open-exit?

What is the impact of youth on adult basic ed programs (re: Q27)—in some states, youth having trouble in school are being pushed into adult education classes—don't know what effect this has on older learners or on service delivery.

Look at work done by: MDRC on NEWWS/JOBS evaluation (re: Q25), research agendas for Center for Applied Linguistics and RTI.

SECTION 6: INFORMAL AND AVOCATIONAL LEARNING

Kevin Dougherty:

What is avocational and informal learning?
Avocational learning:
Political and Citizenship
a. means of influence
b. economy, processes and trends, what are leaders doing
c. diversity, gender, race, class
d. environment
Life and Career Planning
a. How do you construct a career out of sequence of jobs
b. How to search for jobs
c. What type of training do we choose
d. Timing, when should we do training
Family
a. Child development, how we guide our children
b. Prepare children for future
c. Work and family, balance competing demands
d. How do we look after elders
Financial Planning
a. When to save, what to save
b. Saving for college, own costs
c. Rainy day funds (Saving timing versus instruments)
Health
a. How to navigate the system, what about the research
b. New innovations

Note that much of above can be work-related. Cannot separate vocational/avocational.

Much avocational training comes from formal system (postsec, training vendors, other vendors). Sometimes these formal systems provide informal learning.

Other Informal Learning:
a. Employers (pensions, health)
b. Unions (pensions, health, education)
c. Hired consultants (e.g., family therapy)
d. Quasi-education institutions (libraries, museums, senior centers, park districts, etc.)
e. Mass Media, (Print, TV, CD-ROMs, movies, documentaries, etc.)
f. Issue associations
g. Friends and relatives (primacy of information from personal sources) (e.g., book clubs)
h. Travel

Concern: Why do we need data on these things? These have no policy relevance.

Response: Need to define the learner's choice set—can truncate for survey purposes, but good to have full list, to be aware of what is being left out.

But if we truncate we lose information and ignore part of the universe. What if people find out more about health from avocational sources than from public schools? Isn't this worth knowing?

Do we want to know how much info people get from formal vs. informal sources—competing sources and funds. (Debate on importance of informal learning)

Policy relevance:
—may be differences in where/how people get info by groups of policy relevance (by class, race and ethnicity).
—interest in whether informal domain is "usurping" formal domain. Competing institutions for public money may be of interest.

Repeated cross-sectional cuts—flexibility is needed in data monitoring system.
What is core in a survey, some of these issues are supplementary and could be added on one time basis.

Complementary exists between education in one area of life with what we need to learn in other areas of life: What personal experiences and characteristics make one more willing/able to learn informally?

Access to higher education for minorities, difficult to gain information about scholarships—use MTV to get message out, rather than internet, brochures. Marry this to list, learning from MTV, friends, we should be doing things differently. Informal sources may be more effective, better able to reach certain disadvantaged groups? (Effects on equity, distribution of information)

Most legislators believe this stuff (informal) is what lifelong learning is? Don't take it seriously. Not adult education, not continuing education, this informal is where LLL is for Ellie Greenberg.

Emerging trend: More education/information content in more sources—linked to increased need for more knowledge/skills in adulthood?

Even among college graduates, education does not explain career and income perfectly. Adaptation to life, these are high level skills. Much learned informally.

Basic question: Where do individuals acquire their knowledge?

Learning content is being produced by higher education, but the medium for transmitting that content (higher ed institutions) is outmoded.

Quality of learning that K-12 system produces does not match what TV can produce.
But information from informal sources may not be most appropriate, in the best interest of the learner/worker.

Informal/avocational education may have economic benefits as well as personal, social benefits. Also, disinterest in political system is very important; informal/avocational education might help address political cynicism by helping people better address issues, make decisions. This can get policy makers interested.

Do we need to check periodically on how much people know? NHES can measure how much people know?

SECTION 7: INSTRUCTIONAL USES OF TECHNOLOGY

Mark Milliron:

This is the only methodology that has been discussed.
Award winning teachers, teaching excellence, use of technology and issues.
TLC, or: In what ways is technology used to expand instruction, in ways that also serve the community?

Ways technology is used by award-winning teachers:
1. Student production of knowledge
2. Student-driven learning (Web Site, lab)
3. Presentation of material
4. Communication and collaboration
5. Research and reference
6. Management of instruction

Many ways you can use technology, the number one and two ways are student centered. The for-profit providers are giving people the tools to use methods one and two. Controversy about whether technology can effectively help learning. See new publication with Patricia Cross.

Is technology well used? Determines its effectiveness. **Have to know how technology is being used.** What technology is being used, and how is it being used, now your instructional strategy is out there. The half life of technology knowledge is short—is that time and training worth it? Affects decisions of faculty and students.

Technology literacy is now a basic skill. How does this lead into (other) basic skills?

How do we ensure equal access to technology? (Is this issue going away on its own, over time?) Access is opening up, but access without training is an insult. Oracle wants to develop information systems with instructional processes. Instructional tools, writing across the curriculum, are all facilitated by technology. **Need access to training as well as to the technology**.

Learning hardiness (ability to learn in a variety of contexts, learn on one's own) is a key requirement in the information economy. Technology makes it more important.

There is an issue of how to use computers, we need to think developmentally about technological literacy. Assess and then teach technology literacy.

General Discussion:

Error! Started with classroom base. This is not what is going on. Internet and video technology is where action is happening.

Gap in access in training and equipment is being filled. Faculty is often not motivated to use technology, but it is happening anyway. Creating courses online, 100s of courses and 1000s of students.

All college money tied up in tenured faculty, how much is left to make conversion?
Access is challenge for public policy. Hardware is not equitably distributed.

K.C. Green, Campus Computing Survey (survey on computer use in postsec—Mark M)

IT issues now focused on instruction, when before it was administration.

Adult basic education problems can be solved with technology, students can take charge.

Is there something different about this in the transformation of our lives? As technology progresses, learning will be delivered at virtually no cost. Universities that do not transition will die, will become cost-ineffective. "The web has changed everything"

What do people need to know? Now technology is in the way (but moving beyond this). Oracle: program to offer all computer network support to education institutions—let institutions focus on teaching, rather than on hardware support issues.

Faculty and human touch are most important. Oral and communication skills are needed for new technology—also needed in the workplace—don't lose sight of these. Technology is a tool for communication, not a substitute.

Access issue: Just because there is a computer, TV/VCR at home does not mean the adult has access to it.

Using internet requires complex learning skills. Does population have these skills? We need to be at least intermediate on the intellectual complexity scale, if we are lower on this generally then we have a major problem. Need info gathering skills, independent learning.
It is no longer enough to talk about reading, writing, and math, but we need new technology skills. **Assessment of technology skills.**

In what modes do people need to think? Not what we need to KNOW? Relational not literal understanding, numeracy is not operations but a conceptual frame.

Learning hardiness, and knowing who to ask will become more important than actually knowing anything.

What causes people to stall out—stop learning, no longer see utility and relevance?

With technology, learner has direct access to information, can we trust this information? The internet is full of real junk. Lose filter provided by instructor, expert. Need to be wise, informed consumer of information. (Is instructor supposed to be a filter or to teach students how to filter?) Same "problem" arose with printing press.

Tactical Approach: The extent to which estimate will be represented by cross sectional estimate versus event history.

MEETING SUMMARY: PRIORITIES AND MAIN POINTS

1. Need to develop a comprehensive monitoring framework—we have sell this to NCES management. Must balance need to be comprehensive and policy-relevant.
2. What is going on with employer training—more or less, who pays for it?
3. Expanding market of education providers—include "other" providers. We need to think about people's universe of choices
4. Broader array of outcomes than employment and income
5. Lifecycle perspective on adult learning
6. The role of the government? Where the marker fails.
7. Focus on learners and learning
8. Equity in the face of restructuring and technology
9. Are there simple ways to monitor skill levels
10. Where are people on technology literacy
11. Immigrant population, fluency in own language—in English
12. International data on key issues
13. Adult basic issues—motivation and participation needs to be understood
14. Formal vs. informal discussion, choice sets—more ways for people to learn
15. How is technology being used for instruction? And how well is technology being used?
16. Population of providers, so diverse and changing so rapidly that to come up with LLL estimates from providers would be ill-advised. How will we establish proper list of providers in future?

Plans for Future

What can we do in the time we have? (Unclear)
Use feedback from today to focus on important policy issues, blend with comprehensive monitoring system. Also, look at what data we already have.
Today's meeting will also have influence on other surveys, e.g., ILSS, NHES, NALS

For us to look at:
NCRVE survey 1989, non-credit enrollments. Norton Grubb
Steve Johnson, U Texas, Austin, Dissertation on workforce development (John W. has seen this)

BACKGROUND REPORT:
ISSUES FOR MONITORING LIFELONG LEARNING

National Center for Education Statistics
Lifelong Learning Task Force

Technical Review Panel Meeting
February 25, 1999

SECTION 1: INTRODUCTION

The Lifelong Learning Technical Review Panel (TRP) has been convened to help the National Center for Education Statistics (NCES) determine the most critical issues concerning lifelong learning that should be addressed in future federal data collection and research efforts. This document is designed to provide TRP members with an organizing framework and stimulus for discussion of those issues. The document presents a preliminary list of issues that NCES' Lifelong Learning Task Force has identified as relevant to describing and understanding lifelong learning. The goal of the TRP meeting is to modify this list as necessary, and then prioritize the issues to reflect panel members' views on the most critical topics for federal attention.

This document is organized into seven sections. This introductory section presents the investment perspective on learning, which guides much of the discussion in subsequent sections. The Introduction also defines key terms used throughout the document, and discusses the scope of inquiry for our analysis of lifelong learning issues. The second section describes "monitoring" data; these are the fundamental data necessary to monitor the condition of lifelong learning in the United States, including the social, demographic, and economic changes that affect lifelong learning. The remaining five sections of this report divide lifelong learning into five topic areas, outlining issues within each topic area that we have identified as important for understanding that particular area of lifelong learning. These five topic areas are as follows: (1) service delivery in postsecondary and other institutions; (2) the education of workers; (3) the acquisition of basic skills; (4) informal and avocational education; and (5) instructional delivery using new technologies.

UNDERLYING ECONOMIC MODEL

Labor and welfare economics provides a framework for examining lifelong learning, particularly work-related learning. According to the economic model underlying this framework, learning is an investment, in terms of both time and resources, that generates a return—often in the form of financial rewards, but including nonpecuniary returns as well. For example, completing a literacy program may improve an individual's earning capacity, but it may also result in rewards such as increased self-esteem and improved social functioning. Regardless of the nature of the return, the greater the amount and duration of that return, the larger the learning investment that can be justified. Conversely, the higher the cost, including the opportunity cost of foregone earnings while learning, the less education that can be justified. This analysis applies not only to the decisions made by individuals, but also by sponsoring agencies, most notably employers. Thus, for example, the longer an employer can retain employees after training, the more worthwhile it is for the employer to pay for employee training. The model also applies to society in general, since society derives numerous benefits (i.e., receives a long-term return on its investment) from having a well-educated citizenry.

This economic model classifies "goods" (in this case, education activities) based on the nature of their returns. Education activities that result only in nonpecuniary benefits—such as guitar lessons taken merely for the personal satisfaction of being able to play the guitar—are referred to as *consumption goods*. Education activities that result in pecuniary benefits—such as a computer graphics course that provides a graphic artist with the skills needed to attract clients—are referred to as *investment goods*. Many education activities, such as the literacy example discussed above, function as both consumption and investment goods.

Some education activities, particularly those that develop work-related skills, can function as an investment good for both the participant and others. Education activities that improve workers' skills may benefit an employer through increased productivity, and may benefit society by decreasing social transfers (such as welfare payments) and increasing the tax base. Education activities that provide benefits to others in addition to the participant are called *public goods*; those that benefit only the participant are *private goods*. In most cases, education activities benefit more than just the participant. But the degree to which the participant benefits versus an employer, community, or society as a whole can vary widely—that is, the extent to which the activity functions as a public good versus a private good typically ranges along a continuum.

The extent to which a learning activity functions as a consumption versus investment good or public versus private good is critical in determining how that activity should be financed. To the extent that education benefits the individual, the individual should bear the cost. To the extent that society as a whole or particular employers benefit, the government or employers should pay. Simply put, this economic model states that the costs should be borne proportional to the benefits received by each entity involved. The education and training of adults is usually of most benefit to corporate America—but the degree to which *individual employers* benefit from training their workers may be impeded by factors that make employers' willingness to invest in such training lower than it theoretically should be given corporate benefits in the aggregate.

International comparisons of labor force development show that the U.S. labor market operates differently than that of many of our major competitors. The United States has relatively few cultural, legal, or financial impediments to changing employers. Thus, in the U.S. compared to other countries, young workers spend longer periods of time in transitional jobs before deciding on a career, employee tenure with particular employers is shorter, and the number of jobs an individual holds during his or her lifetime is higher. Additionally, as employers have attempted to control labor costs, the rewards that traditionally accrued to those with high levels of seniority are more easily attainable by switching employers. These conditions create fluidity in the labor market, which discourages individual employers from investing too heavily in their workers. Faced with a mobile labor force, employers are often likely to prefer hiring workers who already have the skills they need rather than training them in-house.

Under these conditions, employers are likely to under-invest in worker training, as those who "should" be investing in this training find little incentive to do so. In recent years, increased competition, increased variability in skill needs, and a concentration on short-term profit flows have contributed to a climate where the rewards of investing in employee training are not apparent to many employers. Given indications that an under-investment in worker education may be growing, it is important for the government to re-examine its role in supporting education opportunities for adult workers.

DEFINITIONS OF TERMS

To guide our initial work, the Lifelong Learning Task Force has adopted the following definitions for "lifelong learning" and other related concepts. These definitions may be revised as our work progresses. In particular, modification may be required to operationalize terms in a way that allows valid and reliable measurement in survey and interview data collections.

Lifelong Learning

As part of policy efforts to create "a nation of learners," lifelong learning refers to the ability and willingness of individuals to learn throughout their lives, not just during the years of compulsory schooling. Thus, at least in theory, lifelong learning is a *philosophy* of learning. In practice, however, the term typically has been implicitly or explicitly defined as post-compulsory learning programs and opportunities for adults. The precise definition of an "adult" learner and the types of programs or opportunities that count as "adult learning" may vary or remain undefined. Regardless of the specifics, the interest in strengthening and encouraging continual learning among adults is paramount.

This task force follows the convention of restricting "lifelong learning" to learning for and by adults. Further, since the basic goal is to ensure continued learning beyond initial formal schooling, we restrict our interest to the learning activities of adults after they have ended full-time participation in the formal education system. We assume that individuals remain in formal education until after the age of compulsory attendance, so that our definition of "adult" refers to those 16 years of age or older.

Using this definition, we would include high school students who directly enter part-time postsecondary education as lifelong learners, but would not consider high school students who directly enter full-time postsecondary education as lifelong learners. On the other hand, all postsecondary students who had a break in their education between secondary and postsecondary enrollments would be considered lifelong learners, as would all high school dropouts who return to an education program. Also included, of course, are less structured learning activities and those that occur in other settings such as the workplace, libraries, or community-based organizations.

The exclusion from "lifelong learning" of those often referred to as "traditional" postsecondary students (i.e., full-time enrollees direct from secondary school) may be considered odd. However, NCES has an extensive postsecondary education data collection system that focuses on this group. Although part-time and older students are also included in this data collection system, many policy issues unique to these "nontraditional" students are not sufficiently well addressed by the existing system. For example, nontraditional students are not always seeking a degree or other credential, so assessment of their "persistence" or "success" in postsecondary education must use measures other than the attainment of a credential. In addition, noncredit courses, which nontraditional students are more likely to take, are not included in NCES' current postsecondary data collection system. As a final example, it is only recently that this data system has distinguished between two policy-relevant groups of part-time students—those who work but are "primarily students," and those who are "primarily workers" taking courses.

Throughout this document, we use the terms "lifelong learning" and "adult learning" interchangeably. Because it is conventionally used this way, we reserve the term "adult education" to refer to adult basic education (including literacy, high school completion, and English-as-a-second-language programs).

Formal And Informal Learning

Researchers typically distinguish between three types of learning: formal, nonformal, and informal. Formal learning (or education) is (1) planned and organized, with a formal curriculum and evaluation process; (2) mediated by an instructor; (3) offered at recognized learning institutions; and (4) externally motivated (e.g., to meet compulsory education requirements, or to acquire a credential or job skills). The K–12 education system and college and university courses are examples of formal learning. Nonformal learning is also planned and mediated by an instructor, but it is less structured than formal learning, with no formal curriculum or evaluation process; it is offered by a wide range of education, social, and civic organizations, and is typically intrinsically motivated. Examples of nonformal education include Elderhostels, 4–H Club programs, and organized museum tours. Informal learning involves no mediating instructor, curriculum, or evaluation process, and is typically intrinsically motivated; it is self-directed learning. Informal education can include reading, visits to historic sites, and unguided museum visits. It also includes observational and experiential learning—what is commonly referred to as "learning by doing," or "learning from a community of practice."

For the purposes of this task force, both nonformal and informal education are considered informal. In other words, we use the term "informal learning" to refer to all learning that does not involve a structured curriculum or evaluation process; there may or may not be an "instructor." Informal learning is typically voluntary in nature, but may be extrinsically motivated, as in the case of a new hire who is required to participate in a one-year mentorship program as a condition of employment.

It should be recognized that not all learning activities can be neatly pigeonholed as formal or informal. Depending on their structure and goals, for example, piano lessons can be classified as formal or informal. A workplace mentoring program can be highly informal, or can be formalized, with the mentor evaluating the new employee as part of a final hiring process. In sum, although the formal/informal distinction works in most cases, it is an idealized dichotomy that does not always conform to the variety and complexity of education activities in the real world.

Work-Related and Avocational Learning

Whether a learning activity is vocational or avocational depends entirely on the learner's initial reasons for pursuing the activity. If the learner initially engages in the activity primarily to acquire skills or knowledge to help get or keep a job, or to perform his or her current job better, the activity is *work-related*. If the learner's primary goal in undertaking the activity has nothing to do with employment prospects—it is undertaken for "fun" or for "personal reasons"— the activity is *avocational*. Note that it is the learner's *initial* purpose that defines the activity. For example, if a person initially enrolls in a painting class "just for fun," but by the end of the course decides that he wants to pursue painting as a career, the activity is considered avocational, since the original reason for enrolling in the class was avocational.

The distinction between work-related and avocational learning corresponds to the distinction between learning as an investment and learning as consumption. As discussed above, learning as an investment refers to engagement in activities for which there is an economic return. These coincide with work-related activities, for which the learner expects to be rewarded through greater job security, pay, mobility, or promotion opportunities (and/or the employer expects productivity increases). Learning as consumption, or engagement in activities for which the learner expects no reward other than the knowledge or skills provided by the activity itself, typically encompasses avocational learning experiences.

Types of Skill Development

Learning is designed to instill knowledge and develop skills. Analysts typically divide adult learning into three categories, depending on the types of skills the learning activity is designed to develop:

- *Work-skill development:* This category encompasses learning that provides skills needed for work. Obviously, work-skill development is undertaken for work-related reasons, and utilizes education as an investment.
- *Personal development:* The development of personal skills and knowledge is undertaken for personal, or avocational, reasons, and utilizes education as a consumption good.
- *Basic-skills development:* This category of learning provides adults with basic academic skills that were for some reason not acquired during the years of compulsory schooling (this includes English-language skills for those whose first language is other than English). The goal of basic-skills development can be either work-related or avocational—and often includes some combination of both goals (thus utilizing education as both an investment and consumption).

Work-skill development can be further divided into three other categories, based on the relationship between the skills being learned and the learner's job situation. These categories are as follows:

- *Initial skill development*: Describes the development of the skills needed to enter a job—whether the skills are needed for initial trainees or workers retraining in a new field (some analysts separate these two).
- *Skill updating*: Describes the development of new skills needed for a current job, typically in response to advances in technology or to organizational restructuring.
- *Career skill-building*: Describes the development of the skills needed to move up a career ladder from a current job to a higher or different job in the same or similar organization.

SCOPE OF INQUIRY

Lifelong learning covers a lot of educational ground. As defined here (and in most other conceptualizations), it includes everything from an unemployed, illiterate adult learning to read in a family literacy program, to a practicing doctor taking a continuing education seminar on AIDS treatments, to a parent learning about how birds descended from dinosaurs on a family trip to the museum, to a part-time college student majoring in computer science while working as a secretary. To help focus our discussion of lifelong learning issues, we have divided this broad topic into five narrower topic areas, each of which covers one major aspect of lifelong learning, as follows:

1. *Service Delivery in Postsecondary and Other Institutions:* This section discusses alternative service delivery strategies, and presents issues relevant to understanding how adults are served by postsecondary and other education institutions.
2. *The Education of Workers:* This section discusses the factors that make worker education unique from other adult learning, and presents issues relevant to understanding the need for worker education and how this need is met.
3. *The Acquisition of Basic Skills:* This section discussed the types of skills that are targeted by adult basic education programs, and presents issues that are particularly relevant to describe and understand these programs.

4. *Informal and Avocational Education:* This section discusses the role of informal and avocational learning in adults' lives, and presents issues that are relevant to understanding each of these less well studied types of education.
5. *Instructional Delivery Using New Technologies:* This section discusses the potentials and limitations of new technologies as an instructional service delivery system, particularly for adult learning. The section presents issues that help describe the instructional uses of new technologies and understand why they are or are not being used.

Although these topic areas were selected to be as distinct as possible, there are overlaps among the issues that arise in each topic area. We tried to assign each issue to only one topic area, but some redundancy is inevitable. In addition, in order to monitor the condition of lifelong learning, a number of basic, descriptive questions about participants, providers, finance, etc. are listed in a separate "monitoring" section (see section 2).

We attempted to broadly cover lifelong learning, but also to set some boundaries. In particular, the following four topics were intentionally excluded from our discussion, either because they are more appropriately addressed in other NCES or Department of Education (ED) data collection systems, or because they are beyond the scope of research typically conducted by ED. These four topics are as follows:

- *The foundation for lifelong learning:* To describe the learning process, there is no expression more apt than "as the twig is bent, so grows the tree." Indeed, the foundation for adult or lifelong learning is laid in early childhood, and it is during those early years that society can have the greatest influence on individuals' propensity to become lifelong learners. These early years and early influences, important though they are, are beyond the scope of this inquiry and will not be considered here.
- *Postsecondary education system:* Many adults are enrolled in postsecondary education courses; these adults and their education needs, experiences, and outcomes are within the scope of this inquiry. However, the postsecondary education system "writ large" is not within our scope. There are many interesting issues in postsecondary education (such as faculty tenure and affirmative action policies) that we have excluded because they are not issues of *particular* relevance to the adult learner.
- *Evaluation of adult education programs:* One of the most important questions to ask about any education program is how well it works—which program features work best, which work least well, what the full range of program outcomes are, etc. Since other offices within ED are responsible for conducting program evaluations, we exclude that type of data from consideration here. However, measures of the economic returns to adult education are deemed appropriate to consider.
- *Non-economic returns to lifelong learning:* As previously mentioned, adult education can result in many benefits in addition to financial rewards (for individuals, employers, and society). Improvements in self-esteem, civic and family responsibility, and health are a few of the non-economic benefits that adults can obtain by furthering their education. Important though these benefits are, they are beyond the scope of this inquiry. For our purposes, we focus only on economic returns, including wages, employment rates, and (for employers) productivity. We do allow one exception to this rule—reduced recidivism rates are an important outcome for prison education programs, and should be included in any examination of the outcomes of these programs.

SECTION 2: MONITORING LIFELONG LEARNING

BACKGROUND

In the 1980s, the American economy and American worker were suffering. Competition from other countries, particularly Japan and Germany, was cutting into the American market at home and abroad; company layoffs and downsizing were common; unemployment was high; and workers' wages were stagnant. During this time of economic uncertainty, two reports called attention to inadequacies in workers' skills. The first report was *Workforce 2000*, published by the Hudson Institute in 1987. Although the findings of this report have been debated in scholarly circles, the basic premise—that there is a growing skill shortage in the workplace—captured the attention of policymakers. Reinforcing these findings was a 1989 report by the National Center for Education and the Economy, *America's Choice: High Skills or Low Wages!* The title says it all.

Even as the American economy improved during the 1990s, concerns about the skills and abilities of American adults remained high. In November 1997, the Commission for a Nation of Lifelong Learners released their report *A Nation Learning: Vision for the 21st Century*, in which they concluded the following:

> Without a commitment to comprehensive lifelong learning:
> - America cannot maintain its leadership in the global economy.
> - America puts at risk its democratic way of life and erodes the fundamental values of a civil society.
> - America cannot provide its individuals and families with a higher standard of living, assured employability, safe communities, and a better future.
> - America cannot fully benefit from its people's capabilities.
>
> Today, America falls short on this commitment.[1]

Most recently, in December 1998, Vice President Gore convened a White House Summit on "21st Century Skills for 21st Century Jobs," which focused on the need for American workers to continually renew their skills and for American companies to foster learning opportunities for their employees.

This renewed emphasis on lifelong learning has also been supported by federal dollars. After a period of essentially flat funding during the early 1990s, federal adult education funding has increased dramatically from the mid-1990s to today. The 1997–98 federal budget for adult education grants was $340 million. Under the 1998 Workforce Investment Act, this support was increased to $365 in 1998–99; the President's budget proposal for 1999–00 increases support for adult education programs to $460 million.

Why is there such great concern with adult education, especially when today's economy is so strong? In short, the problems of the 1980s seem to have served as a "wake-up call." The American public and policymakers no longer take for granted our economic pre-eminence. As international competition increases and the economies of developed countries rely more heavily on human resources rather than natural resources, attention has shifted to the importance of "human capital"—the skills and abilities of American workers. If the American economy remains strong, will lifelong learning and workforce skill development disappear from the policy radar screen? Or has the nature of the workplace and adult life changed in ways that have made lifelong learning an enduring issue? The latter would seem to be true, but only time will tell.

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[1] Commission for a Nation of Lifelong Learners (1997), *A Nation Learning: Vision for the 21st Century*, p. 2.

Within this larger social context, NCES is re-evaluating its (lack of) focus on lifelong learning. As the central data collection agency for national education statistics, what data should NCES collect concerning lifelong learning?

NCES and Lifelong Learning

NCES has a congressional mandate to collect and report "statistics and information showing the condition and progress of education in the United States and other nations in order to promote and accelerate the improvement of American education." NCES has historically fulfilled this mandate using a wide range of data collection instruments that

- survey students, parents, teachers, and administrators within the public and private elementary, secondary, and postsecondary education systems;
- survey the public (household members) about their demographic characteristics, education attainment, and education and work experiences; and
- provide institutional record data from public and private elementary, secondary, and postsecondary education institutions at the state and local levels.

From these data collections, NCES annually publishes (in addition to numerous statistical reports) two volumes that provide summary data on the current status of the education system and trends in education over time. The first of these annual publications is the *Digest of Education Statistics*, a comprehensive compilation of statistical information on the American education system. Of 422 statistical tables in the 1997 edition of the *Digest*, three present data on adult education. A few additional tables provide data relevant to adult learners (such as the education attainment levels and school enrollment rates of adults).

The second annual publication, the *Condition of Education*, is an indicators report, presenting key data that measure the health of the education system and trends in major aspects of education. The indicators in the *Condition of Education* are important but limited measures. As noted in the publication, "an indicator is policy relevant and problem oriented; it usually incorporates a standard against which to judge progress or regression. Indicators cannot, however, identify causes or solutions and should not be used to draw conclusions without other evidence." The 1998 edition of *Condition of Education* includes the following indicators relevant to lifelong learning: participation in adult education; age of first-time beginning postsecondary students; international comparisons of adult literacy; education attainment levels (nationally and internationally); and the relationships between welfare participation and educational attainment and between earnings and education attainment. (This is seven out of a total of 60 indicators.) The 1998 edition also includes three indicators indirectly relevant to lifelong learning: undergraduates who work while enrolled in college, adult civic involvement, and parents' involvement in their children's education.

In 1997, NCES published a new indicators report that also includes data relevant to adult learning. This report, *Education and the Economy*, presents a number of indicators describing the relationship between adults' success in the labor market and their education attainment, education achievement, and training experiences.

The data on adult education published in these three reports provide the beginnings of what could become a comprehensive monitoring system for lifelong learning. In this section, we outline the full range of data that seem appropriate to include to fulfill a basic monitoring function. We start with data to monitor the lifelong learning system itself, and then discuss social and economic trends that are important to monitor because of their effects on the demand for lifelong learning. Since we are examining issues that apply to all types of adult learning, we phrase our questions in terms of lifelong learning in general. However, this is done only for the sake of brevity. In practice, it is typically more useful to ask and answer questions separately for specific types of lifelong learning, such as work-related or employer-provided education, avocational education, or adult basic education. In this section, disaggregation to lower, more relevant levels of analysis is assumed.

As noted above, an indicator typically addresses *what* is happening, but not *why* it is happening. In this section of the report, we focus first on the "what" questions that provide indicators *to describe* lifelong learning. For each such indicator, we also list "why" questions that are important *to understand* the condition of lifelong learning described by the indicator. Unlike later sections of this report, this section focuses on indicators and issues that are relevant to *all* sectors of lifelong learning (formal postsecondary education, informal education, work-related, basic skills, etc.). Later sections focus more narrowly on issues that are pertinent to specific sectors of lifelong learning. Finally, we also list measurement issues—issues addressing *how* data are to be collected—separately at the end of the section.

DATA TO MONITOR LIFELONG LEARNING

Skill Demand and Motivation

If adults are to continue learning throughout their lives, they must be interested in learning and perceive it to be of value. Particularly if adult learning is to become more self-directed (as seems to be the case), it is critical that all adults be aware of the importance of continued learning in their lives and be motivated to be continuous learners. We need to monitor these characteristics in the adult population.

1. **To what extent do adults *recognize the need* to be continuous learners?** What policies or practices are most effective in increasing this awareness? What role do formal education, the workplace, and other institutions play in increasing this awareness?

2. **What are adults' perceptions of the *value* of lifelong learning activities for their own lives?** What learning activities do they find most valuable, in theory and in real life?

3. **To what extent are adults *motivated* to continue learning? Do adults have an "appropriate" level of motivation?** What policies or practices are most effective in increasing motivation? What role do education institutions, the workplace, and other institutions play in increasing motivation? To what extent can a lack of motivation be attributed to personal, situational, or program characteristics?

4. **To what extent are employers satisfied with the skill levels of the workforce? To what extent are workers satisfied with their opportunities to increase skills?** What changes would both groups like to see in these opportunities?

Participation and Access

From the surveys and studies that currently exist, we already know quite a bit about levels and patterns of participation in lifelong learning. For example, NCES National Household Education Survey (NHES) found that participation rates increased from 32 percent in 1991 to 40 percent in 1995. This survey also found that those with higher education attainment levels are more likely to participate in adult learning than those with lower attainment levels. Adults in the mid-career age-range are more likely to participate than are younger or older adults, and employed adults are more likely to participate than are unemployed adults.[1] Participation rates also vary by occupation and industrial sector (e.g., construction, manufacturing). Data such as these are basic to monitoring the status of adult learning.

5. **How many adults, and what proportion of adults, participate in lifelong learning activities?** In other words, what is the *extent* of participation, and what is the *incidence rate* for participation in lifelong learning?

6. **What is the intensity of participation in lifelong learning activities? That is, how much time and money is invested in each activity? Do incidence and intensity rates reveal different patterns of participation?** Intensity rates are particularly important to assess for informal and work-related learning activities (e.g., on-the-job training), which can vary widely in intensity.

7. **Which adults participate in lifelong learning activities and which do not?** Do participation patterns vary among groups of policy interest? How can those with little formal education be encouraged to become lifelong learners?

8. **How do participation rates vary across the adult lifespan?** What factors explain these changes over the life cycle?

9. **What are the patterns of movement into and out of lifelong learning?** Are there key life events that trigger or hinder participation (e.g., marriage, childbirth, and job changes)?

10. **What are the trends over time in participation in lifelong learning?** What motivates these trends? Are there specific groups of adults for which these learning activities are becoming more or less popular? Are participation trends similar for different types of adult education?

We know that adults who have higher levels of education are more likely than those with less education to participate in adult learning. But it is not clear what underlies this difference. While those with more education may place a greater value on education, it may also be true that these adults work in occupations that require more continuous learning, or for which learning is more likely to pay off in terms of career development. More educated adults also tend to have more financial resources for education activities, as well as more "psychic" resources for focusing on personal development activities of any type. We need to better understand these participation patterns.

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[1] Participation in adult basic education programs are the exception to these patterns. Participation rates for these programs are highest for adults with low levels of education, and for younger adults.

11. **What are the demands for continuous skill development or lifelong learning that characterize different occupations?** Do occupational fields that have higher initial education demands also have higher continuing education demands?

12. **To what extent is participation (particularly in avocational education) restricted to those with more disposable income or time?**

There is an extensive literature on the "barriers" to participation in lifelong learning activities, particularly for adult basic skills programs. These studies have been of limited use because they often fail to distinguish among adults with different levels of interest, or between the costs and benefits to participation. For example, time and money are almost universally acknowledged as barriers to participation (even participants admit such). To help increase accessibility and the motivation for participation in lifelong learning by adults, it is helpful to know what incentives participants report that overcome these disincentives, and how the perceptions of participants and nonparticipants differ.

13. **What are the *costs* (disincentives) and *benefits* (incentives) to participation in lifelong learning that motivate the behavior of participants, interested nonparticipants, and uninterested nonparticipants?** To what extent is participation limited by a lack of incentives rather than by disincentives? What incentives seem to encourage participation? How can existing disincentives be overcome—by providers or by government agencies?

Service Delivery and Financing

In addition to knowing who engages in lifelong learning, knowing who provides such opportunities is also important. This issue is not as easy to address as it may seem. As lifelong learning opportunities expand, they are also becoming more diverse in nature. Not only are programs serving more targeted groups (e.g., technicians for specific computer systems), but new providers are moving into the adult education market and new combinations of providers are developing and offering adult learning programs. For example, an employer may fund a learning activity that is offered by a postsecondary institution, or a postsecondary institution may offer a program that uses a corporation's training curriculum. In short, service delivery methods and, thus the concept of "provider," have become complex.

14. **Which organizations (1) offer learning activities for adults, (2) fund learning activities for adults, and (3) provide curricula for adult learning activities?** Who is moving into and out of each of these markets?

15. **How extensive a role do formal education institutions play in the provision of adult learning opportunities?** Are the structure and focus of formal education institutions changing in response to the demand for lifelong learning?

16. **How extensive a role do employers play in the provision of adult learning opportunities?** How is their role changing over time?

17. **To what extent are new technologies (including the Internet, CD-ROMs, and telecommunications) used as a delivery mechanism for adult learning?** Do these technologies increase access to adult learning in an equitable or inequitable fashion?

In order to encourage lifelong learning, some have argued that we need to develop and foster a community approach to learning. These "learning communities" would offer a wide range of formal, informal, work-related, and avocational learning opportunities for their citizens.

18. **How prevalent are "learning communities"?** More generally, how available are formal and informal learning resources to adults in various types of communities (e.g., urban, suburban, rural)?

Who pays for adult learning opportunities is another basic monitoring question. Human capital theory dictates that the costs for lifelong learning activities should be borne proportionate to the benefits received by the individual, the society, or (when relevant) employer. Employers' lowered commitment to workers, combined with rising postsecondary education costs, suggest that a growing burden is being place on individuals. Costs need to be re-examined in light of these trends.

19. **What is the financial cost to individuals of their participation in adult learning activities? What is the cost to employers, or to federal or other government agencies?** Are the costs (particularly for work-related education) distributed equitably according to the benefits received? Are costs borne equitably among different policy-relevant groups of adults (e.g., the employed vs. unemployed)?

20. **How do adult learners finance their education activities?** To what extent do cost considerations limit participation, persistence, and program completion?

Participation Outcomes

The government's interest in fostering lifelong learning lies in the ability of such learning to improve the economic and social functioning of society. As previously mentioned, many of the benefits from these learning activities are beyond our scope of inquiry. However, the extent to which programs are completed and the economic outcomes of completion are within our scope.

21. **What are adults' completion rates for (formal) adult learning activities?** What personal, situational, and programmatic factors affect completion rates?

22. **What are the economic returns to work-related lifelong learning activities?** Studies typically use employment rates and earnings as measures of return. But increasingly, adults engage in work-related learning not to get a job or promotion, but merely to keep up to date with new technologies or to adjust to new organizational roles in their current position. Measures of economic returns may not be able to capture this benefit.

TRENDS AFFECTING LIFELONG LEARNING

Current attention to lifelong learning is typically explained by economic, demographic, and technological changes in today's society that have created an unprecedented demand for lifelong learning—learning that is perceived as vital for America's future as a nation. In this section, we examine the major trends that are purported to shape the demand for lifelong learning. In many cases, questions can be raised about the extent to which these trends (which are often not new) suggest that lifelong learning is significantly more vital to our nation *today* than it was in past decades. One goal of monitoring these trends should be to separate the enduring issues from the emerging issues that make lifelong learning critically important for America at a particular point in time.

Changes in the Economy and Workplace

Some of the changes in the American economy and workplace that are credited with increasing the demand for lifelong learning have been with us for a while. In the past 26 years, three national commissions have examined the importance of lifelong learning (in 1973, 1984, and 1997). Each of these commissions noted particular trends that were driving the demand for lifelong learning—labor market shifts from the manufacturing to the service sector, increased international economic competition (or the "globalization" of the economy), the growing need for technological skills, an increase in the level of skills required in the workplace and in everyday life, and changing demographics. More recently, changes in the structure of work, in response to the globalization and "technization" of the workplace, have also been noted to affect skill demands. None of these trends are independent from each other; rather, they interact and feed off of each other. For presentation purposes, we try to discuss these issues separately, but we recognize that doing so creates an artificial distinction that does not exist in the real world.

The Global Economy. International competition provides threats on two fronts. The first and largest threat is to low-skill manufacturing jobs. These jobs have always been vulnerable to export, as under-developed countries provide a large and cheap pool of unskilled labor. The globalization of production and finance made possible by advanced telecommunications have made such overseas operations easier and more cost-efficient than ever. This technological change, combined with more open trade markets, has fueled the movement of low-skill jobs to foreign countries. The second threat comes from other developed countries, which can increasingly use technologies developed in the United States (or elsewhere) to compete in the burgeoning industries that are based on high-tech applications. Both the loss of low-skill manufacturing jobs and high-tech competition from other developed countries increase the need for the development of high levels of skills among U.S. workers.

Changing Work Organizations. As U.S. corporations face more competition from international markets, they have found it necessary to become more efficient in order to maintain a competitive edge.[1] Two strategies are commonly used to increase efficiency: the "lean and mean" strategy of downsizing and cost cutting, and the "high performance" strategy of investing in technology and human capital while decentralizing control to frontline workers. In general, the consensus seems to be that after a period of large-scale downsizing, corporations are now adopting more high-performance strategies. Corporations are becoming less hierarchical, and workers are being given more responsibility for quality, scheduling, and to some extent, productivity. Skills such as teamwork, problem solving, and self-management are more critical for workers in these "high performance" workplaces.

A third corporate response to increase efficiency is the increased use of contingent (part-time or temporary) workers. These workers save companies money in two ways. First, they often do not receive the full range of benefits that full-time, permanent employees receive. Second, they can be laid off and hired on an as-needed basis, cutting costs during periods of low demand. Basically, they allow companies to "tailor" their workforce to shifting labor demands.

Accompanying this shift toward a contingent workforce is a shift in companies' investment in worker training. Before the 1980s, the prevalent pattern was for employers to hire employees at relatively low skill levels, invest relatively heavily in training them, and employ them for life. Since the 1980s, however, both the pace of technological innovation and demands to keep corporate worksize as lean as possible have made it less desirable for companies to invest heavily in training their workers. Firms are increasingly unwilling to make substantial investments in training that might be rendered obsolete in a relatively short period of time, or to train workers who may be laid off. Consequently, employers are moving from the historical tradition of "making" workers to the more recent practice of "buying" pre-skilled workers for whom they need not make a heavy training investment.

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[1] Although the drive to increase corporate efficiency is typically discussed as a response to global competition, other factors seem to be at work as well. While median workers' wages have remained stagnant or declined in recent years, corporate productivity has increased, along with the incomes of CEOs and the top 20 percent of the population. The failure to return productivity gains to workers suggests a misalignment of incentives.

23. **What are the trends in workplace organization and structure that are believed to affect skill demands?** What are the trends in computer usage on the job? In working in teams? In decentralized, participatory decision making? In the use of a contingent workforce?

24. **What are the trends in employers' investment in workforce training?** To what extent do employers attempt to hire fully skilled workers rather than train workers on the job? How is this expectation related to the nature of the work, the size of the company, and company turnover rates?

Labor Market Shifts. At the same time that new technologies are contributing to the loss of low-skill manufacturing jobs, they are also raising the demand for information and communication services. As a result, the labor market shift from the manufacturing to the service sector, while nothing new,[1] is likely occurring at a more rapid pace today than in the past as new technologies accelerate the trend. It is this relatively rapid change toward information technologies that has given today's economy the label "post-industrial" or "information" age.

Shift in Job Skills. Technology changes the job-skill mix through its effects on both the distribution of jobs in the labor market and the nature of existing jobs—i.e., it changes the prevalence of particular jobs in the labor market, and it changes the skills required by existing jobs. In some cases, the infusion of new technologies results in the "de-skilling" of jobs, in other cases it results in job "up-skilling." Although there has been much debate about the overall effect of these changes, the consensus seems to be that the net effect has been a modest up-skilling within the labor market.

But the de-skilling/up-skilling effects of technology are also credited with creating a pool of high-skill, high-wage jobs, leaving behind a pool of low-paid, low-skill nontechnological jobs (a manifestation of the "digital divide"). To the extent that technology is polarizing jobs into low and high skills, it may be contributing to a particularly troubling economic trend—the growing wage disparity between those workers with a college education and those without.

Some have argued that this growing wage disparity signals the increased value of a college education in today's labor market (even though wages for college-educated workers have remained flat, rather than increased). Others argue that the decline in wages for those without a college education has been "artificially" deflated by the relatively large influx of uneducated immigrants, who are typically willing to work for minimal wages. The decline in unionization, itself driven by increased market competition, has also been estimated to account for part of the wage inequality increase. With fewer threats from unions, corporations find it easier to return profits to CEOs and stockholders, rather than to workers—particularly the lowest-skilled, most easily replaced workers. But at least one source (the Federal Reserve Bank of New York) credits almost *half* of the growth in inequality to the effects of technological innovation.

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[1] From 1959 to 1984, the proportion of workers employed in the goods-producing sector fell from 60 percent to 28 percent. Over the same period, the service sector increased from 40 percent to 72 percent of all employment.

Finally, it also has been noted that the fastest-growing jobs in today's economy require higher levels of education than do other jobs, on average. (Most of these jobs are in the health and computer industries.) However, these fast-growing jobs are relatively small in number. The vast majority of jobs in the workplace of the early 21st century will be jobs that already exist today. The more important question for these jobs is how skill needs may be changing within them.

These economic and workplace changes imply the need to monitor a number of labor market features.

25. **What is the trend in the demand for skills in the economy?** What are the trends in the demand for skills within specific jobs that *dominate* the economy? What are the trends in the demand for specific types of skills (e.g., reading, mathematical ability, teamwork, communication skills)?

26. **What are the trends in the relationship between the supply of skills and demand for skills (unmet demand)?**

27. **What are the trends in the demand for continual skill development among different occupations?** This is an especially important consideration among occupations that rely heavily on new technologies, where applications change at a rapid pace.

28. **What is the trend in the mix of jobs in the labor market, by job-skill or educational attainment requirements?**

29. **What are the trends in the returns to education for different education attainment levels?** What is the trend over time in wage growth, and what is this trend's relationship to trends in adult skill levels and corporate productivity?

Technological Changes

As discussed above, technological changes affect skill demands in the workplace. New technologies can either increase or decrease the skill demands of a job. They can also increase the need for adults to continually update their skills, for example, in response to new software or hardware. Finally, as discussed in detail in section 7, new technologies also have implications for the delivery of adult learning services.

30. **What are the trends in the use of computers by workers and by adults in general? What are the trends in how computers are used in the workplace and at home?**

31. **What are the trends in how computers and other new technologies change the skill requirements for workers?**
32. **What are the trends in the use of computers and new telecommunications technologies in adult learning?** What are the trends in the use of computers for administrative functions, or as a learning tool (e.g., word-processing)? As a means of delivering instruction (e.g., distance learning)? For testing and diagnostic evaluation? To deliver curriculum?

Demographic and Lifestyle Changes

The most significant demographic change affecting the demand for adult learning is the "middle-aging" of the Baby Boomers. The Baby Boom generation is now about 35 to 53 years old, the prime adult working years. Thanks to a number of factors that spurred college attendance in the 1960s and 1970s (e.g., economic prosperity, the Vietnam War, the women's movement), the Baby Boom generation is also notably more highly educated than the generations that came before it.[1] Those adults who are more highly educated are more likely to participate in adult learning. Thus, the greater college-attendance rates of Baby Boomers, combined with their sheer numbers, create conditions for an unprecedented demand for adult learning activities, particularly work-related learning activities.

33. **What are the trends in the age composition and education attainment levels of the adult population?**

34. **What are the trends in participation in lifelong learning by all adults, and by adults in particular age cohorts, and education attainment cohorts?** Are Baby Boomers creating a higher level of demand for work-related adult education now, which will decline as they begin to retire? What effects will this cohort have on the demand for other types of adult education activities?

The other major demographic trend affecting the demand for lifelong learning is the continuing increase in diversity, or minority representation, in the population. This long-term trend is being accelerated by high rates of immigration. However, diversity in the American population is not new, and the current increase in diversification is not dramatic. What makes this trend significant is the recent lack of educational progress among minority groups. For example, while the high school graduation rates for blacks have increased to that of whites, rates for Hispanics still lag far behind. Further, college attainment rates for both blacks and Hispanics, although rising, continue to lag below the rate for whites, with no signs of closing the gap. The increasing size of these minority populations (particularly the Hispanic population), combined with continued lower levels of education, suggest the potential for increased adult basic education needs and job-skill shortages.

35. **What are the trends in the racial/ethnic distribution of the population, and in the educational attainment levels of these sectors of the population?** What are the trends in participation in lifelong learning by different racial/ethnic groups?

Finally, the nature of adult life itself has been changing over time. The lifecourse is traditionally conceptualized as a regular pattern of transitions and roles that individuals experience as they age; the normative course has been a routine shift from student to worker and from spouse to parent. While these orderly shifts have never characterized everyone's lives, in recent decades the pattern has become less "orderly." For example, while in the past many adults made a single transition from school to work, now many adults are continually changing between or combining the roles of student and worker. Participation in adult education is now more prevalent than is the pattern of formal schooling ending at a discrete point in time.

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[1] According to the 1997 *Digest of Education Statistics*, from 1960 to 1980, the percentage of adults who had completed four or more years of college increased from 8 percent to 17 percent. From 1940 to 1960, this percentage increased only from 5 percent to 8 percent and from 1980 to 1996, it increased only from 17 percent to 24 percent.

36. **What are the trends in how individuals move from compulsory education (the role of student) to adult roles? What are the trends in how adults combine work, family life, and education?**

MEASUREMENT ISSUES

37. **Which policy-relevant groups of adults should be included in examinations of lifelong learning?** For example, adults might be grouped by age; gender; race; socioeconomic status; employment status (unemployed, employed full-time, employed part-time, temporary or contingent worker, not in labor force); occupation and/or industry sector; education attainment level; immigration/language status, etc.

38. **Should we use a "life cycle" approach to divide adults into age-specific groups that are more analytically useful?** What age-group divisions make the most sense?

39. **Can a meaningful typology or framework for lifelong learning be developed to guide examination of this topic?** From the framework adopted for this report, lifelong learning could be divided into the following 13 categories: adult basic education (ABE)/literacy; adult secondary education (ASE); English-as-a-second-language (ESL); work-related postsecondary for-credit; work-related postsecondary noncredit; avocational postsecondary for-credit; avocational postsecondary noncredit; employer-sponsored formal; employer-sponsored informal; other formal work-related; other informal work-related; other formal avocational; and other informal avocational. Are all of these activities worth monitoring?

40. **Can we develop a useful typology of providers?** Given that collaborative relationships appear to becoming common, how can and should we define providers? Does it make sense to distinguish site providers, funding providers, curriculum providers, etc.?

41. **Can disincentives to learning be categorized in a more useful way**? For example, categorizations might include access problems (e.g., institutional or policy barriers, shortage of offerings); individual problems (e.g., motivation, family concerns); or programmatic problems (e.g., ineffectiveness, irrelevance)?

42. **Can we—or should we—determine what "appropriate" motivation levels are?** Is it correct to assume that everyone should be equally motivated to engage in adult learning? Is it correct to assume that those with lower levels of education should be more motivated to pursue adult education? What individual circumstances (occupation, family situation, etc.) should be considered in making this determination?

43. **Can geographic "learning communities" be operationally defined and identified?**

44. **How can we assess employers' skill demands independently of employment cycles?** (How do we control for the fact that skills are in shorter supply when unemployment is low, and are in greater supply when unemployment is high.)

Analyses of responses to the NHES suggest that courses that are more informal, such as work-related courses and personal development courses, tend to be under-reported, while enrollment in credential programs and adult basic education courses tend to be accurately reported.

45. **How can we better measure learning activities that are not formalized?**

SECTION 3: SERVICE DELIVERY IN POSTECONDARY AND OTHER INSTITUTIONS

As the demand for continuous knowledge and skill development increases, it becomes more critical to develop effective methods to deliver instruction to adult learners. For adults, the opportunity costs for education are large—adults literally cannot afford to spend time in learning activities that either have little or no payoff in the labor market or provide little or no intrinsic reward. To minimize opportunity costs and to increase the returns from education, it is important that education opportunities for adults be tailored to meet their needs. In this section, we explore the issues associated with service delivery for adults. Since postsecondary education institutions are one of the most common providers of adult learning activities, we focus on these institutions. (Employers, another major provider, are discussed in more detail in section 4, The Education of Workers.)

BACKGROUND

Postsecondary institutions are notoriously slow to change. In the past, this has not been a major problem, as their clientele changed little. While the need for individuals to acquire education grew, "more of the same" was sufficient—as more students completed high school, more high school graduates entered college, and more of these young students graduated from college. Adult and continuing education programs remained among the lowest status programs in postsecondary institutions, just as community colleges remained "second rate" colleges.

But in recent years a confluence of factors—higher tuition costs, a growing cohort of mid-aged adults, economic and labor market changes, and technological advances—have shifted the education market toward the older adult learner. For postsecondary institutions and many other education providers, this shift raises questions about the institution's mission, its curriculum, and its instructional delivery strategies. Postsecondary institutions can, of course, continue to focus on the "traditional" young adult; this market has not, and probably will not, disappear. But many are finding this narrow focus to be financially and/or philosophically unappealing. On the other hand, the changes required to more effectively serve adults—such as customized training, more flexible and accessible instructional formats and delivery systems, and collaborative relations with other institutions—are difficult and sometimes resisted. For many postsecondary institutions, these conflicting needs and demands can create an institutional identity crisis.

Adults who are interested in pursuing education activities often face a number of constraints, many of which apply most often to (traditional) postsecondary coursetaking. Time is perhaps the greatest and most common constraint, since work and family responsibilities typically take up most of an adult's waking hours. Thus, any education that is offered outside of working hours, or even during working hours with no concurrent reduction in workload, may be difficult to pursue. Other factors that increase the time commitment or further interfere with family responsibilities (e.g., long travel time to education site, no childcare arrangements) create additional barriers. Costs are also a common deterrent, especially when the economic returns to participation may be unclear or delayed. For some adults in need of further education or training, a lack of self-confidence, motivation, or interest in available offerings poses additional barriers. These latter barriers are more difficult to evaluate, since they may reflect a mix of internal (motivational) problems and external (situational) conditions that make available offerings of limited benefit.

To minimize these barriers, particularly for work-related education, a number of new instructional strategies are gaining ground—strategies that minimize the time and cost constraints experienced by adult learners trying to balance work, family, and personal lives, and that help both adults and their employers balance the costs and benefits of investing in training. These instructional delivery strategies include the following:

- on-site training at the workplace,
- flexible scheduling,
- "just-in-time" or on-demand instruction,
- individual and small-group offerings,
- competency-based evaluation and portable credentialing, and
- contract or customized training, tailored to an employer's specific needs.

Some postsecondary institutions, particularly community colleges, have been fairly innovative in adopting these new strategies. However, as evidence of both the growing demand for adult learning opportunities and the failure of traditional postsecondary institutions to meet this demand, a growing number of alternative providers are emphasizing these new strategies. Three types of alternative providers that have attracted attention are corporate universities (e.g., Motorola University); virtual universities (e.g., Western Governors University, soon to become the Governors Open University System); and private for-profit universities (e.g., University of Phoenix, DeVry Institutes).

In short, service delivery policies and practices are critical to any system of lifelong learning. These issues are most relevant in the postsecondary education sector, which has the potential to provide (separately or in collaboration with employers and other agencies) the bulk of adult learning opportunities, but where change is implemented slowly.

SPECIFIC ISSUES

Before listing specific service delivery issues, it is important to understand the larger role that postsecondary (and other) institutions play as providers of adult learning. Which adults do they serve, how many do they serve, and how are these adults served? For example, we know that the proportion of older students enrolled in postsecondary institutions has increased in recent years, and that part-time enrollments have increased slightly. But there is little evidence on what is driving these trends.

1. **What are the trends in enrollments of part-time and "adult" students? What factors contribute to changes in these student enrollments?** To what extent are tuition increases forcing more students to delay entry and to attend part-time (cost factor)? To what extent are these increases driven by the aging of the Baby Boom generation (demographic factor)? To what extent are more students finding after they enter the workforce that their initial education was not sufficient (skill-demand factor)?

2. **Why do adults return to school—what skills and knowledge do they seek to acquire?** What proportion of their coursetaking is taken for work-related versus avocational reasons? Of work-related coursetaking, what proportion is taken for initial or qualifying training, retraining, skill upgrading, or career advancement?

3. **What are adults' educational goals when they return to school?** For example, what proportion of adults enrolled in postsecondary institutions intend to earn a degree or other credential?

An institution's student body typically reflects its mission. Institutions serving greater proportions of adult learners are likely to place more importance on the goals of workforce preparation and economic development than on fostering personal growth and development. But we know little about the emphasis placed on these goals throughout the current postsecondary system. Tracking the extent to which postsecondary institutions focus on these goals provides some indication of how these institutions respond to demands for adult learning.

4. **What proportion of postsecondary institutions (overall and by type) explicitly target workforce preparation and/or economic development as an institutional goal?** What proportion of these institutions have this as their primary mission? What trends are occurring in this emphasis over time?

5. **What proportion of postsecondary institutions (overall and by type) explicitly target personal enrichment as an institutional goal?** What trends are occurring in this emphasis over time?

6. **What indicators do postsecondary institutions use to measure success in meeting their institutional goals?** For example, for economic development goals they may use (1) graduate placement rates, (2) employer satisfaction with graduates, and (3) training partnerships as indicators; for personal development goals, they may use student satisfaction ratings or student referrals.

More broadly, there are fundamental issues concerning the role of postsecondary institutions in serving adult learners, and how the demand for adult learning is changing the landscape of postsecondary education.

7. **How are "traditional" postsecondary institutions changing in response to adult learning demands?** That is, are these institutions becoming more specialized as demands for adult basic education and work-related education compete with traditional academic education—or are institutions increasingly broadening their focus?

8. **How is the mix of postsecondary and other adult learning providers changing over time, and how is this affecting access and program quality?** What role should the federal government play in supporting the growth of nontraditional postsecondary providers, or in supporting new service delivery options within traditional institutions?

9. **What is the role of postsecondary institutions in the larger service delivery system for adults?** What proportion of adult learners do such institutions serve, and which learners do they serve? What is their role in the provision of adult basic education, work-related education, and avocational education for adults?

10. **What are the enrollment patterns of adults at different types of postsecondary institutions?** Are these patterns linked to institutional mission, support services provided for adults, service delivery methods, costs, or other policies or practices?

Institutions that want to serve adult learners must target their offerings and instructional delivery systems to address the needs of these learners. From the learners' perspective, these accommodations help increase access. Monitoring changes in service delivery helps track the ways in which access is changing for adult learners.

11. **To what extent are institutions offering alternative delivery methods?** To what extent are they utilizing distance education technologies or working collaboratively with employers or vendors to provide contract training, just-in-time training, or worksite-based training?

12. **To what extent does the use of alternative delivery methods appear to increase access to learning opportunities?** Are these methods resulting in more or less equitable access among policy-relevant groups (e.g., by socioeconomic status, employment status, locale)?

13. **To what extent are institutions offering support services or special accommodations to improve access for adult learners, or to otherwise better serve adult learners?** These can include special counseling services for adults, transportation services, childcare, extended hours for library or other student service offices, streamlined registration procedures, and evening and weekend offerings.

14. **To what extent do these support services appear to increase access to learning opportunities?** Are they resulting in more or less equitable access among policy-relevant groups (e.g., by socioeconomic status, employment status, locale)?

The opposite side of the access issue—existing barriers to access—also deserves continued attention. As discussed above, a number of factors—some intrinsic, some situational—make it difficult for many adults to engage in education in general, and in postsecondary courses in particular. These barriers need to be tracked over time, especially in conjunction with changing policies and practices and new federal initiatives.

15. **What constraints keep adults from participating in relevant education activities, specifically those offered by postsecondary institutions?** How can these barriers be overcome—by institutions themselves, by states, and by the federal government?

Federal, state, and institutional funding policies were almost all developed with the "traditional" student in mind. Many of these policies may limit or impede adult enrollment. For example, federal student aid restricts eligibility to those enrolled at least half-time; some states reimburse their public institutions based mainly on enrollment in for-credit courses or degree programs, which can raise the costs for continuing education programs. The effects of policy on adults' access to and participation in postsecondary education deserve attention.

16. **What federal, state, and institutional policies encourage or discourage enrollments of the "nontraditional" or adult learner?** What more innovative policies are being developed, and how can they be encouraged?

17. **To what extent have recent federal initiatives such as the Hope Scholarship and Lifelong Learning tax credits been effective in reducing the cost barriers to adult participation in postsecondary education programs?**

One aspect of traditional postsecondary education that may limit adult participation is the academic curricular model. Adults are often not interested in lengthy, theoretical courses, much less in degree programs; they are often more pragmatically focused on narrower, more limited education objectives. In many cases, noncredit courses can meet adults' needs for work-related or avocational learning. We know little about noncredit coursetaking.

18. **What is the role of noncredit coursetaking within postsecondary institutions?** Which institutions offer it, and for what institutional purposes (generate finances, public service, economic development, etc.)? How common is noncredit coursetaking among adults? What trends are occurring in noncredit coursetaking?

19. **Who participates in noncredit courses at postsecondary institutions, and for what purposes (basic skills development, etc.)?**

Noncredit coursetaking also raises another issue. That is, how can adults document their skill attainment if courses are not taken for credit? Documentation of skills also becomes increasingly complicated as the range of providers grows and adults find themselves "swirling" through learning activities offered by employers, education institutions, professional organizations, and self-learning vendors. As more adults engage in a broad range of focused learning activities, pressures are mounting for postsecondary institutions to offer outcome-based credentialing systems.

20. **To what extent are postsecondary institutions offering competency-based assessments, portable credentials, or other outcome-based approaches that allow adults to document their skills and knowledge, regardless of "seat time"?**

As new institutional providers and delivery methods proliferate, the outcomes of education also deserve renewed attention. We know that there are clear returns to completing high school, taking some college coursework, and completing a college degree. But the returns to more limited coursetaking, and to different instructional delivery methods, are less clear.

21. **How much college coursework, and what type, is necessary to ensure a return to education?** Is anything lost (or gained) when a traditional course is offered via telecommunications? What effect, if any, does distance education have on adults' degree-completion rates? Do corporate universities increase an individual's economic prospects among outside employers?

MEASUREMENT ISSUES

Retention and graduation rates are often used as indicators of the success of postsecondary institutions or their students. But for a growing number of adult learners, these measures are invalid success indicators, as the learner may have no intention of taking more than one course or a few courses.

22. **Given the range of goals held by adult learners in postsecondary education, how can we measure the success of these students in meeting their goals?** What meaningful indicators of success apply to students who are not seeking a degree or credential?

Another difficulty in measuring success arises from the fact that adult learning activities may in some cases not be designed to produce employment or economic gains, but merely to ensure that one does not lose ground. That is, adult learning may sometimes serve mainly to keep a worker from becoming out-of-date or "obsolete." Continuing education programs for doctors and teachers, for example, often serve in this manner.

23. **Given the fragmented, intermittent nature of much adult coursetaking, how do we measure its effectiveness—particularly if its effect is not necessarily to increase wages or job status but merely to keep workers from becoming obsolete in their current job?**

It also becomes more difficult to determine who the provider of instruction is when institutions work collaboratively to offer courses. For example, who is the instructional provider when one organization (e.g., a publisher, a software manufacturer) develops course materials and another organization (e.g., postsecondary institution, employer) offers the materials? Or when the materials are used at yet another site (e.g., provided by a postsecondary institution but offered at worksite)? Who is the provider when a postsecondary institution and a multimedia organization collaborate to offer a distance education course? The answer to these questions may depend on why the question is being asked (e.g., to determine who financially supports courses). We need to consider more carefully what "provider" information we want and how to get it.

24. **Which organization should be considered the instructional provider?** Are there useful ways to distinguish among the different roles that various institutions may play in the development and offering of adult learning opportunities, such as distinguishing among financial providers, content-area providers, and site providers?

SECTION 4: THE EDUCATION OF WORKERS

As we have seen, much of the interest in lifelong learning derives from concerns about the competence and competitiveness of the American workforce. This section examines lifelong learning issues that apply specifically to workers.

In this section more than others, we use the term "training" as well as "education." Training refers to learning that is narrowly focused, applied, practical, and contexualized. Education refers to learning that is broader, more conceptual and theoretical, and, thus, decontextualized. So, for example, one is *educated* about electro-magnetic theory and *trained* to be an electrician. Some learning experiences combine both types of learning. This is especially true in the expanding technical fields, as applications of scientific theories are at the heart of technical work. An electrical technician, for example, needs a strong foundation in both theoretical and practical aspects of electrical systems. Given the blurring of lines between these forms of education, we use both terms loosely in this section (and throughout the report). We also use both terms to refer to skills training or education. Thus, we are typically not interested in health and safety training, orientation training, or other forms of training that workers frequently receive, but that are not primarily intended to improve workers' skills on the job.

BACKGROUND

The education of workers is a somewhat unique part of adult learning. First, the myriad economic trends discussed in section 2 affect the supply and demand for worker education more directly than they affect other types of adult learning. New technologies, organizational restructuring, changes in the job-mix and changes in the skills required of jobs—all affect the education needs and opportunities of workers first and foremost. Second, worker training is strictly an investment good, with private and public returns to the individual worker, employers, and society. Finally, because of their application to specific work settings, the skills that workers need are often contextual or applied in nature, and often learned informally.

Supply and Demand. Employers have always needed to be flexible, to change and innovate in order to remain competitive. But the combined effects of global competition, expanding and contracting markets, rapid technological innovations (and corresponding obsolescence), and regulatory changes appear to be making skill needs less predictable, which in turn makes employers less willing to make long-term commitments to employees. Meanwhile, workers increasingly find that their skills are made obsolete by technological and organizational changes. As a result, employees are increasingly pressured to update and expand their skills in work settings where employers may have declining incentives to provide training. In this more turbulent market, employees also face increased pressure to maintain and update their skills in order to be ready to compete for a new job. Finally, the shift toward a technology- and knowledge-based economy creates demands for skills that may be lacking in the current workforce, which initially prepared for a different world of work. In short, numerous pressures within the economy are creating shifts in worker skill needs and opportunities that are ongoing and as yet not well understood.

Economic Returns. The vast majority of employers (other than the smallest) offer education and training opportunities for their employees; employers are the most common providers of formal worker training.[1] Moreover, the contextual skills that are critical to many aspects of job performance are acquired mainly on the job. While employers do not "offer" this on-the-job experience, they can create conditions that serve to foster or inhibit employees' informal learning experiences.

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[1] Not all of this is skills training, however. Much of the training that employers provide focuses on other issues, such as health and safety, workplace orientation, equipment use, and equal–opportunity or diversity issues.

An employer's willingness to offer formal skills training or to support informal learning experiences depends on the returns to that investment for the employer. There are significant benefits to employee training, including increased worker satisfaction and the creation of a better product or service—both of which help increase productivity. But because workers often change jobs, employers cannot always fully capture the returns to their training investment, and therefore may find it more cost-effective to hire workers with the skills they need, rather than "produce" skilled workers in-house. At the same time, while employers may seek to focus training on skills that are useful only within the company (those skills that cannot be "hired" from the outside), workers are most interested in training that increases their employability and earnings in *and* out of the current company. The amount and types of skills training available to workers depends largely on how these economic incentives are balanced within the labor market.

Contextual Knowledge and Informal Learning. The knowledge that workers need to perform their jobs is often divided into two types. The first type, conceptual knowledge, refers to abstract-reasoning skills, and facts, theories, and other systematic forms of knowledge. Because conceptual knowledge is explicit and decontextualized, it is easily codified in manuals, computer programs, and instructional curricula. There are informal means for acquiring conceptual knowledge, such as independent reading of texts or manuals; however, conceptual skills are traditionally associated with *formal* schooling, and most formal education programs focus on conceptual knowledge.

In contrast, contextual knowledge refers to familiarity with materials, procedures, working conditions, and appropriate ways of behaving and interacting within a particular setting. Contextual knowledge can be at least partially acquired in a formal setting, such as a "hands on" vocational education course, or an applied training program. Typically, however, most contextual knowledge is gained *informally* from on-the-job experience and interactions with coworkers.

It has been estimated that most of the skills workers use on the job are contextualized rather than conceptual. So it is not surprising that employees get most of their work-related training informally rather than formally. Even among managers, most work-related knowledge is developed from informal rather than formal experiences. Given the prevalence of informal education and contextualized learning in the workplace, it makes little sense to attempt to monitor workers' education *without* including these learning experiences.

These factors specific to worker education raise a number of issues related to (1) the demand for worker education; (2) the provision of education opportunities for workers, including opportunities for informal learning; and (3) the outcomes of worker education for both employees and employers. Policies that affect the delivery of worker education also need to be addressed.

Issues Concerning the Demand for Worker Education

There has been much talk of a "skills gap." What evidence is there that such a gap exists?

1. **To what extent do employees feel that they have the skills required for their current job, or for the job they would like to have in five years? To what extent are workers comfortable with their skill levels, and with their opportunities to increase their skill levels?**

2. **To what extent are employers satisfied with the skills of their employees? To what extent do employers report that the skill demands for particular occupations are increasing or decreasing?** To what do employers attribute these changing skill needs?

3. **What types of skills are increasing and decreasing in demand?** Do workers and employers have the same views on which skills are in demand? Do workers have an accurate perception of how the labor market is changing?

To say that workers need to develop skills or are engaged in skills training is obviously of limited utility. Various categorizations of work skills have been developed to help specify the nature of skill demands in the workforce. Skills can be classified based on their generality or transferability in the labor market. The typical classification for this purpose is as follows: generic work skills, industry- or occupation-specific skills, and company-specific skills. Skills can also be classified based on the type of skill involved. Various skill-type classifications have been used, typically incorporating some combination of the following: interpersonal and communication skills, self-management skills, basic or literacy skills, technical skills, organizational skills, and problem-solving skills. Assuming that a useful classification of work skills can be adopted, it is informative to examine the demand for specific types of skills.

4. **For what types of skills do workers seek skill training?** What are the trends in the types of work-skill training received?

5. **To what extent is the *mix* of skills required in the labor market changing—in general, and in particular occupation/industry groups?** In what ways is it changing?

6. **To what extent are the work skills required in the labor market those that are specific to individual employers, to an occupation or industry, or to the workplace in general?**

Traditionally, workers voluntarily seek out education and training opportunities in order to advance their careers. But labor market trends suggest that worker education increasingly may be undertaken not as part of a career progression, but as a result of downsizing, outsourcing, project termination, or technological obsolescence.

7. **What are workers' motivations for engaging in work-related learning?** What percentage of worker training is undertaken as a pro-active effort to increase earnings or job status versus as a reactive effort to maintain their ability to perform their current job? What percentage of worker training is undertaken in response to technological or organizational change, or to job loss? To what extent is workers' participation motivated by concerns of losing a job?

8. **To what extent and under what circumstances is work-related learning viewed as an opportunity or a burden?**

Management styles and decisions, technological change, and economic pressures also determine whether and how employers choose to obtain skilled workers. Employers' willingness to offer training, rather than hiring "pre-trained" workers, affects skill needs by making it more or less difficult for workers to acquire skills after they have entered the labor market.

9. **How is the workplace changing in ways that affect the demand for skills?** To what extent are employers adopting competitive strategies that are based on learning and investment in knowledge? To what extent are they adopting various strategies that may reduce their incentive to invest in worker training, such as the use of a contingent workforce or downsizing?

10. **What factors motivate companies to adopt competitive strategies that are based on learning and investment in knowledge?**

11. **Are employers offering more or less training to employees? If less, are employees making up for that training loss elsewhere?**

12. **What factors inhibit employers from offering more training than they currently do?** To what extent is market instability a factor? How do the following factors affect employer-provided training: a perceived lack of training needs, high employee turnover, economies of scale (small size), etc.? How are these disincentives related to an employers' organizational structure and hiring policies (e.g., the use of a contingent workforce)?

The demand for worker training is also influenced by what workers learn in formal education before they enter the labor market.

13. **To what extent are formal educational attainment and academic achievement correlated with the various skills required of workers?** That is, to what extent does formal education appear to be an appropriate avenue for acquiring job skills (particularly those in increasing demand), and to what extent does skill acquisition seem to be dependent on learning within the work context?

The dispersion of skills among workers is wider in the United States than in other countries; the U.S. has larger proportions of lower and higher skilled workers. This may reflect both a lack of learning opportunities in the workplace (or elsewhere in society) and a difference in the structure of jobs compared to those in other countries. The correlation between education and skills is also higher in the United States than in other countries, suggesting that the United States places a greater emphasis on skills development in the formal education system, with less emphasis on learning opportunities for workers.

14. **How does government and corporate support for worker training in the United States compare to that in other countries? How does satisfaction with worker skills and training opportunities compare?**

Issues Concerning the Provision of Worker Education

Five groups usually support worker education: workers, employers, labor, government, and higher education. Other groups (such as community organizations) can be involved as well, but less commonly are. Although it is interesting to examine the roles of each of these groups in worker training, the role of unions is of particular interest. Labor unions have always supported worker-training efforts, and to this day joint management-labor programs and unionized apprenticeship programs offer some of the most effective worker training programs. Union-supported training also differs from employer-supported training in that it focuses more on general work skills that employees can use outside the current company or job. But labor unions have been declining in the past few decades. In the 1950s, about 25 percent of private-sector workers were in unions; in 1995, about 11 percent were unionized. As result, labor unions' ability to influence worker education and training opportunities has eroded.

15. **Who funds workers' education?** What proportion of worker education is funded by workers, employers, labor unions, and government?

16. **Where do workers get their training and education?** What proportion of worker education is offered by (i.e., instruction is provided by) employers, labor unions, or higher education? What proportion is offered by collaborations of these groups? Are such collaborative efforts becoming more or less common? What government policies can encourage the creation and growth of such collaborations?

Employers obviously have a special role in the provision of worker training, because they derive benefits from training their workers, they know best what training is required, and they offer the most convenient source of training.

17. **What are the strategies firms use to ensure that their workers have job skills when hired and maintain job skills during tenure?** To what extent do they rely on informal training methods, in-house training, the use of outside vendors, etc.?

18. **Which workers within a corporation receive various types of employer-sponsored training, and for what purposes?**

19. **To what extent does employer-sponsored training (compared to other worker training) focus on generic work skills, occupation-specific skills, and company-specific skills?**

20. **To what extent is training viewed as an integral aspect of work performance and the reward system within a company?** How often is worker skill development/ human capital development an explicit corporate objective? What percentage of employers has training policies, training staff, or training facilities? What percentage provide employees with either an education or training stipend or tuition reimbursements? For what types of skill training do these exist?

Workplace-based programs offered during work hours are the most convenient for workers, as they eliminate most time and cost barriers.

21. **What proportion of employer-supported training is offered on-site during work hours?** Are such training offerings becoming more or less common?

High technology firms seem to be a breed apart. Among these organizations, change occurs so quickly that it is often not feasible to use the contingent workforce model. So high-tech firms often develop extensive in-house training programs, including corporate universities.

22. **What are the training strategies used by high-tech firms?** Do trends in other corporate sectors suggest that high-tech firms provide a model for the future, or does it appear that employers' training strategies may become polarized along with job skills?

Issues Concerning Informal and Contextual Worker Education

As previously discussed, much of workers' skills development is contextual in nature and occurs through informal methods.

23. **What proportion of the skills used by workers in various occupations are contextual versus conceptual?**

24. **To what extent do workers rely on formal or informal methods to develop and update their skills?** To what extent do they rely on each method for their contextual knowledge? Their conceptual knowledge? To what extent are various types of skills acquired through formal or informal methods?

25. **How accessible are informal worker-training opportunities, and to what extent are employees encouraged to use them?** How accessible are learning sources such as libraries, Internet, manuals, demonstrations or lectures, etc.?

Most informal learning is believed to occur through a "community of practice," that is, through interactions with coworkers. More specifically, a community of practice is defined as an occupational group who routinely has face-to-face interactions at a worksite. These local groups may be part of occupational communities, which are larger, more formally structured occupational groups that span worksites. The steel workers at a particular worksite would compose a community of practice, as would the nurses within a hospital's intensive-care unit. The steel workers union would form an occupational community, as would the nurses within a nursing professional organization.

26. **To what extent do workers rely on their coworkers for contextual knowledge?** To what extent do workers believe their worksite is characterized by "knowledge-sharing" versus "knowledge-hoarding"?

27. **What working conditions encourage or impede the sharing of skills and knowledge through "communities of practice" or "occupational communities"?** For example, how do the separation of workers into autonomous divisions or branches, physical separation and isolation, internal competitiveness, and the provision of "common rooms" encourage or impede the sharing of skills?

In the large and growing service sector (currently accounting for about three-quarters of all jobs), interaction skills are often crucial because they are directly part of the provided service (e.g., teaching, psychotherapy); they affect impressions of the quality of the service (e.g., friendly waitpersons, flight attendants); or they help determine the success of service delivery (e.g., persuasiveness of salesclerk or bill collector). In the past, these skills have often been taken for granted and assumed to not require training. In recent years, as the service industry has become more competitive, attention has focused on the need and ability to train for interpersonal skills.

28. **To what extent do workers (particularly those in the service sector) have opportunities for training related to communication and interpersonal skills?** How many participate in such training? How valuable do workers find this training?

Issues Concerning the Returns to Worker Education

For worker education to be successful, it must provide returns to employers and/or employees that outweigh the costs each incurs by participating in and offering the education activity. For employers, valued returns include increases in profits, improvement in market position, and the ability to attract skilled workers. For employees, returns include increases in earnings, change in employment status, career mobility, and job satisfaction. Given the pace of change in today's competitive market, sometimes a desirable training return simply may be to maintain the status quo (current profit level or market share, current earnings or position), as opposed to losing ground. Either way, those who get or offer training should end up better off than those who do not.

29. **What are the returns to employees for investing in worker training of various types? What are the returns to the employer?** Returns to employees are particularly relevant for training that employees pay for on their own, or which entail opportunity costs; returns to employers are particularly important to examine for employer-provided training.

30. **Are the training costs borne by employees and employers in proportion to the benefits each receives?**

31. **To what extent do employees judge their training activities helpful and effective?** When these activities are not judged effective, what factors (e.g., too theoretical, focus on wrong skills, etc.) limit their effectiveness?

32. **How effective are various types of training activities?** Formal versus informal activities? Employer-provided versus training from other providers?

33. **How generic or transferable is the training employees receive?** To what extent do employees perceive the training they receive to be useful for other jobs in the company, and/or for jobs in other companies?

34. **Does the availability of employer-provided training make an employee more or less likely to remain with an employer?** To what extent does less opportunity for training encourage employee turnover, and to what extent does high turnover discourage the provision of formal training. What is the direction of causality in this relationship?

Community colleges often provide education and training opportunities for workers. In many situations, these opportunities are targeted to the specific needs of workers who want and need a limited education program that does not lead to a degree or certificate. Yet community colleges are often criticized for their low graduation rates. In addition, many of the training programs that community colleges offer may be designed to help workers adapt to new work technologies or other work changes; such training may not be expected to result in increased worker pay. Yet again, evidence of low economic returns to investment in one or a few courses is often cited as evidence of community colleges' failure to provide a useful public service.

35. **How do workers view the role of community colleges as a provider of worker training? For what purposes do they use community colleges, and what outcomes can be linked to those purposes?** Are there better, more appropriate ways to assess the role and effectiveness of community colleges in serving workers than the measures traditionally used?

Issues Concerning State Policy

As previously discussed, downsizing is one response to competitive pressures. So is replacing older, more costly (higher paid) workers with younger, less costly (lower paid) workers. In many cases, labor market positions for these displaced workers no longer exist, as all corporations are making similar adaptations. The "dumping" of workers back into the labor market with skills that are in low demand can create a serious economic problem. Thus, efforts are under way in many states to subsidize the retraining of displaced workers.

36. **What state policies exist to encourage or support worker retraining efforts?** Is there evidence that retraining programs lower unemployment rates or decrease the amount of time people spend unemployed?

Some states attempt to encourage employers to offer training through the provision of training tax credits. In his 2000 budget, President Clinton has proposed a Workplace Education Tax Credit for employers that offer their workers adult basic education programs.

37. **How common are training tax credits?** How often are they used? What effects do these have on workers' opportunities for skill development? On employers' ability to hire and retain workers?

MEASUREMENT ISSUES

38. **How can the "skills gap" be reliably and validly measured?** Can the effects of fluctuations in employment rates (which determine the availability of a skilled worker pool) be removed from skills gap estimates?

39. **How can we characterize the "culture of learning" within a firm, or define the extent to which a corporation is a "learning organization"?**

40. **Can we define and measure an employee's "choice set" for skill development opportunities?**

41. **Can we determine the extent to which there is an "under-investment" in worker education and training? Can we identify under-investments** by individuals and by firms?

42. **How do we separate skills training from all other kinds of worker training?** Should we focus exclusively on skills training, or include a broader range of worker training?

43. **Can we identify a useful skill mix, a mix that will help policy analysts understand skill supply and demand, the focus of education/training programs, and trends in skill needs over time?** (Some candidates to include in such a mix might be as follows: conceptual skills, substantive skills, interpersonal skills, self-management skills, operational skills, basic skills, technical skills, organizational skills, literacy skills, problem-solving skills, interpersonal and communication skills, industry- and occupation-specific skills, company-specific skills, and soft skills vs. hard skills.)

44. **How can returns to training be properly evaluated in situations where the only expected return is to maintain the current level of pecuniary benefits, rather than to increase those benefits?**

SECTION 5: THE ACQUISITION OF BASIC SKILLS

Basic skills are normally acquired during childhood through compulsory attendance in elementary and secondary school. For various reasons, this acquisition process sometimes fails. In some cases, those with cognitive or physical impairments either were not offered suitable learning opportunities or were unable to take advantage of those opportunities. Especially in past decades, learning disabled children (who are now adults) failed to learn because they did not have access to special-education services. In other cases, individuals who grew up in countries outside the United States may have had limited education opportunities in their homeland; or they may have been well educated, but have entered the United States unable to speak, read, or write in English. Finally, in some cases young people drop out of high school before completing their education because of extenuating personal or family circumstances. Whatever the reason, there are a significant number of adults in America who have yet to acquire the basic skills normally imparted through the compulsory education system. In this section, we examine the unique issues and problems relevant to this group of adult learners.

BACKGROUND

Both public and private agencies have long recognized the need to support adults in their acquisition of basic skills. It is universally recognized that the acquisition of these skills benefits not just individuals, but also their community and the nation as a whole. The acquisition of basic skills helps to produce more responsible citizens and more productive employees; to reduce morbidity, mortality, welfare dependency, crime, and incarceration rates; and to improve mental and general health. Society benefits from each of these improvements and, in general, from the better choices available to and decisions made by those who have mastered basic skills.

Types of Basic Skills and Programs

Adult basic skills are usually divided into three categories, each representing a different set of skill needs: literacy, high school equivalency, and English language fluency. Adult literacy skills are typically provided through adult basic education (ABE) or literacy programs. High school equivalency is offered through adult secondary education (ASE) programs, and English language fluency is provided by English-as-a-second-language (ESL) programs. In addition, various targeted programs exist to address the specific literacy needs of adults in particular life circumstances; these include family literacy, workplace literacy, and prison literacy programs. All of these adult basic education programs are described in more detail below.

ABE/Literacy Programs: The Acquisition of Literacy. Reading, writing, and mathematical (or numeracy) skills are considered the three basic literacy skills required for successful adult functioning. The fully illiterate adult is rare in America. More common is the problem of adults whose literacy levels are so poor that they impede functioning at home, work, and in society; these adults are referred to as *functionally illiterate*. While literacy efforts often focus on reading and writing skills, some adults are limited in their functioning because of an inability to manipulate numbers—to confirm the amount of a bill, calculate change, etc. Adult basic education (ABE) programs serve adults who lack these basic literacy and numeracy skills. In practice, these programs are designed to serve those who have completed education only below the 9th grade.

- The ability to read is perhaps the most fundamental skill for all learning in our society. It is also the basic skill for which most adults seek help. In response, a wide range of adult literacy programs exist; these are supported by federal efforts, two national voluntary literacy organizations, numerous private agencies, and other state and local efforts. Three specific types of literacy programs are encouraged by federal legislation (specifically, the 1998 Workforce Investment Act). These are as follows: *Family literacy programs:* Problems with literacy tend to be "handed down" from parent to child. The intergenerational nature of literacy problems has prompted demand for a family-centered approach to literacy education. Family literacy programs take this approach; these programs attempt to help parents obtain the literacy and parenting skills necessary to become both economically self-sufficient and full partners in the educational development of their children. It is also believed that helping parents learn to read to their children can provide an added incentive for the adult learner.

- *Workplace literacy programs:* Research on adult learning and adult literacy have found that adults (like children) learn best when material is presented in a "real life" context, or an applied setting. For workers who have low levels of literacy, workplace literacy programs provide this type of applied learning experience. These programs teach literacy skills using the skills and knowledge that workers need to be successful in their jobs or to train for new jobs.

- *Prison literacy programs:* The link between a lack of education and criminal behavior is well documented. For example, the prison population has a much lower literacy level and lower high school graduation rate than does the general population. On the positive side, prisoners who participate in education programs have a lower rate of recidivism than those who do not. Prison literacy programs take advantage of the opportunity to reach this population that is provided by inmates' incarceration. These programs have the dual goals of increasing inmates' later chances for employment, thereby lowering their rates of recidivism.

ASE Programs: The Acquisition of High School Equivalency. Some adults have mastered the basic skills but still have limited opportunities to continue their education or advance in the labor market because they never completed high school. In recognition of the importance of this level of skill attainment in the labor market, the 1996 Welfare Reform Act requires that youths receiving welfare payments must be in school or working toward high school completion if they do not have a high school diploma. For high school dropouts and immigrant adults who lack the equivalent of a high school diploma, adult secondary education (ASE) programs provide the opportunity to complete a high school education and earn a regular or alternative high school credential, such as the General Equivalency Diploma (GED) certificate.

ESL Programs: The Acquisition of English Language Fluency. Economic independence and active, responsible citizenship require fluency in the English language. However, for many adult immigrants, fluency in English is unattainable before immigration and difficult to attain afterwards. Without the ability to speak, read, or write in English, non-English speakers in the United States are essentially functionally illiterate. Adult ESL programs provide the opportunity for these adults to acquire this important basic skill more easily and quickly, aiding their transition into the American labor market and society.

These three types of adult basic education programs target different groups of students, who often exhibit different attitudes and approaches to learning. Figure 1 summarizes these differences.

Figure 1—Adult Basic Skills Framework

Program Type	Student Market	Nature of Learning Process
Adult Basic Education (ABE)/Literacy	Learning disabled; those alienated from the learning process	Students have problems that interfere with learning; testing is unwelcome
Adult Secondary Education (ASE)	Dropouts; learning disabled; alienated	May have learning problems
English as a Second Language (ESL)	Immigrants; well-educated to little or no education	Hardworking; usually make good progress

We now turn to specific issues concerning adults' motivation to participate in adult basic education programs, service delivery mechanisms, and the role of federal and state policies. Because the supply and demand of skills in the adult population affect the demand for adult basic education (and can affect what skills are targeted in adult basic education programs), we conclude with an examination of issues related to skill demands and skill levels. In this section of the report, we do not separate measurement issues from other issues, as measurement and other issues tend to be difficult to disentangle when discussing adult basic skills.

SPECIFIC ISSUES

Issues Concerning Motivation and Participation

Participation rates in ABE and ASE programs are difficult to estimate, but are widely regarded to be low. Further, participants often leave programs too soon to achieve significant learning gains. One reason for the failure to adequately serve this clientele may be the traditional "schooling" model used in literacy education. For example, even though adults with literacy problems often have an aversion to school, 75 percent of literacy programs are provided by local education agencies or community colleges. For those formerly alienated by the education process, using schools as providers may be a disincentive.

1. **To what extent is interest in ABE or literacy programs affected by the site providing the instruction?** Are education providers less likely to interest the target ABE population than are other providers, since these adults have already met with failure in the education system?

2. **Why do participants leave programs so early?** To what extent are they leaving because they have met their personal goals? Because the learning process is too slow or difficult? For other reasons?

Conversely, among immigrants seeking ESL classes, school-based programs may be an incentive, since immigrants tend to value and respect the education system.

3. **To what extent is interest in ESL programs affected by the site providing the instruction?** Are education providers more likely to interest the target ESL population than are other providers?

A wide range of reasons for participation in ABE/ASE programs has been documented, including personal growth, family responsibilities, job advancement and economic needs, educational advancement, church or community involvement, and even "diversion." Barriers have been identified also and include the usual time and cost barriers, as well as negative views about education, lack of self-confidence, and more cultural and normative disconnects. Some adults lacking basic skills are essentially alienated from the dominant culture. They may have "proclivities toward nonaffiliation," view the acquisition of literacy as a threat to their sense of community belonging, or reject the entire "education" value system or the worthiness of education programs. So it is not surprising that in a recent national survey, 84 percent of adults who did not have a high school diploma said they were *not* interested in adult education classes. On the other hand, only 27 percent of adults with low English-speaking abilities were *not* interested in participating in ESL programs. These findings point out the importance of analyzing separately (1) those eligible for ABE/ASE programs versus those eligible for ESL programs, and (2) eligible adults who are interested in adult basic education versus those who are not interested.

4. **What are the characteristics of ABE- or ASE-eligible adults who are not interested in participating in these programs (versus those who are interested)?** What are the characteristics of ESL-eligible adults who are not interested in participating in these programs?

In general, adults choose to participate in an education program based on an assessment of the costs and benefits of participation. A higher level of interest signifies that benefits are perceived to be offered by the program; a lack of interest signifies that no benefits are perceived to accrue from program participation. Thus, different questions need to be asked of each of these groups.

5. **Among those interested in participating in adult basic education programs, what benefits are perceived to accrue from participation, and what "costs" or other hindrances (e.g., lack of self-confidence) are perceived to outweigh those benefits? Among those not interested in participating, what factors contribute to the perception that programs offer no benefits?** Can the factors that contribute to a lack of participation or lack of interest be classified in ways that help disentangle problems in service delivery from other problems, or that help policymakers focus on better delivery methods and instructional designs?

It is also worth examining some of these issues within the larger adult population, to help determine ways to minimize self-imposed barriers to learning.

6. **What percentage of the adult population can be described as "alienated" from the learning process?** What can we learn about this group that may help reach them? In general, what is the public's attitude toward education and the value of furthering their education?

7. **Do adults who are "alienated" from the learning process have a preference for certain types of providers—e.g., church groups versus local schools, local community-based organizations rather than community colleges?** If so, can collaborations of these agencies improve access, while utilizing the resources of traditional education providers?

The acquisition of basic skills is pursued more by younger adults than by older adults. For example, over half of those who take the GED test are under the age of 25, and rates of participation in both ABE and ASE programs are much higher among those under 25 than among those over 25. This participation pattern probably reflects the effects of increased opportunity costs with age. It may also reflect the recognition among many of those first struggling to become financially independent that skill development is critical. We need to know more about the timing of the decision to enter these programs and how to get more individuals into them before it becomes "too late," for whatever reason.

8. **What are the main motivating factors among those who do participate in each type of adult basic education program (ABE, ASE, ESL)?** To what extent does dissatisfaction with economic prospects drive interest in program participation? To what extent is participation in adult basic education encouraged by friends, family members, or employers?

Issues Concerning Service Delivery

Another reason for programs' lack of success in reaching their target population may be an inability to appropriately serve adults with learning disabilities. There is a relatively high prevalence of learning disabilities among adults with low basic skill levels. While intensive, individual instruction can make a big difference for these individuals, the ability to diagnose and appropriately teach someone with learning disabilities can be even more important. However, primarily because of low funding levels, most adult literacy programs rely heavily on volunteer instructors, who often have limited instructional training.

9. **What proportion of the adult education teaching force (separately for ABE, ASE, and ESL programs) is voluntary versus paid staff?** What proportion of voluntary versus paid teaching staff has formal education training? To what extent is program participation or completion related to the use of paid staff?

10. **What proportion of the adult education teaching force (in each program area) has formal education in working with adults?** How can the pool of qualified adult education teachers be expanded?

11. **What proportion of the adult education teaching force has formal training in diagnosing and instructing individuals with learning disabilities?** How well prepared are adult education instructors to adapt teaching for students with learning disabilities? To what extent does the lack of a professional cadre of instructors limit the ability to teach adults with learning disabilities?

12. **What proportion of the adult education teaching force has formal training in dealing with alternative learning styles and instructional methods?** To what extent does the lack of a professional cadre of instructors limit the ability to teach adults with different attitudes toward school and education? How well prepared are adult education instructors to adapt their teaching to minimize this problem?

We also need to know more about the extent and nature of learning disabilities among the adult population, and how having a disability affects program participation and demand.

13. **What proportion of the adult population is learning disabled?** Are low-skilled adults with learning disabilities more or less likely than other low-skilled adults to participate in (or want to participate in) adult education programs? Are they more or less likely to complete programs, or to remain in them long enough to derive significant benefit?

14. **To what extent is the demand for ABE/ASE programs affected by the rate of learning disabilities in the adult population?** Might the demand for ABE/ASE programs be declining as schools improve their special-education services (assuming such improvements are occurring over time)?

There are reports of long waiting lines to enter ESL programs in many cities, particularly in cities where immigrants are most heavily concentrated. But the 1995 NHES found that more than half (59 percent) of interested nonparticipants did not know of any classes. Taken together, these data suggest a high level of demand for ESL courses, and a need for better dissemination of available adult education offerings.

15. **What dissemination procedures do ABE, ASE, and ESL programs use?** How effective are these? How do participants learn of available programs?

Because the target population for adult basic education programs is disproportionately poor, programs typically allow participants to enroll at no cost (in fact, federally funded programs require this). But a 1995 survey found that 20 percent of participants in ABE and ASE programs spent over $100 of their own money on program-related expenses, with average personal expenses of $289 for ABE participants and $171 for ASE participants. About one-third of ESL participants paid more than $100 for course-related expenses. Given the background of program clientele, even these minimal costs can be quite burdensome.

16. **How much do participants pay to attend adult basic education programs, and what do these participant costs cover (transportation, childcare, books or other materials, etc.)? Is it possible to increase accessibility by cutting costs to participants further?**

Two notable changes are occurring in how adult basic education programs are offered. First, there is a growth in government and private sector collaborations, in the involvement of community-based organizations, and in general, an expansion of offerings, contexts, and content. Second, as offerings expand, they are also becoming segmented, i.e., programs are targeting specific groups of adults, such as workers targeted by workplace literacy programs, parents targeted by family literacy programs, and programs designed for the homeless, learning disabled, welfare clients, correctional population, etc.

17. **What are the trends in service provision?** Which providers are moving into and out of the adult basic education market (and why)? Are changes being driven by data on effectiveness, legislative requirements, the demand for services, or other factors?

18. **What are the trends in market segmentation?** Does market segmentation lead to increases in access or effectiveness? With what additional costs?

19. **What factors motivate states and localities to offer one type of program over another?** To what extent are their decisions driven by legislative regulations, demand within the state, past successful programs, or other factors?

Because many adults in need of basic skills development have an aversion to schools and formal schooling, alternative delivery systems such as those offered by new technologies are particularly promising for ABE and ASE programs. Innovative uses of new technologies can also help solve the shortage of ESL programs. Computer technologies are particularly promising, as they allow adults to learn at their own pace with minimal frustration and embarrassment, and because the individuals targeted by adult basic education are often interested in learning to use computers, but have few other options to do so.

20. **How many adults are being served by adult education programs that use computer or telecommunication technologies?** How are these technologies being used by programs? Who provides the curricula for these new delivery systems, and is the supply of such

curricula keeping pace with demand? How useful, interesting, or effective do adults find programs that use new technologies?

Finally, the low participation and persistence rates characteristic of ABE and ASE programs raise the question of whether alternative delivery systems or incentives should be considered for these programs. The current volunteer-based, open-entry/open-exit system, which emphasizes access over motivation, seems to work well for ESL programs (which have a highly motivated population), but not so well for ABE/ASE programs. A range of service delivery options and incentives should be considered to address this issue.

21. **Would tuition charges only decrease program access, or might they in some cases provide an added incentive for program completion?**

22. **What effect does employer support—e.g., granting time off from work, offering education opportunities on-site, linking bonuses or raises to education enrichment—have on participation in adult basic education programs?**

Policy Issues

Federal and state policies affect both the supply of and demand for adult basic education. Immigration policies have an obvious influence on the demand for ESL programs. Welfare and job-training policies affect ABE/ASE programs by the manner in which they link education to eligibility for benefits and to services, and by the nature of the indicators selected to evaluate program effectiveness. For example, if job-training programs are evaluated on the basis of employment rates, programs are likely to stress job-search services that move clients into the labor market quickly over education services that move clients into the labor market more slowly.

23. **Does new legislation that requires young adults to complete high school have an effect on participation in or completion of ABE/ASE programs?** Could this serve as a model for other federal efforts?

24. **How have changes in recent adult education and job-training legislation affected the demand for adult education services?** To what extent is recent legislation consistent with the goal of increasing lifelong learning opportunities?

Current welfare reform legislation requires that welfare recipients seek and obtain employment. However, without education to remedy skill deficits that may have contributed to clients' initial welfare dependency, these programs may largely place individuals in short-term, dead-end positions. Programs may be effective in increasing employment rates in the short-term, but at the expense of fostering long-term self-sufficiency.

25. **To what extent are welfare clients provided with education or training opportunities, either as part of job-search services, or as part of the job they move into?** To what extent does this vary by state? To what extent does the provision of education and training services improve long-term outcomes?

More broadly, policies that link education and training to job hiring might help strengthen the incentives for low-skilled adults to enroll in and complete basic education programs, while also encouraging employers to hire low-skilled adults. Adult basic education programs could, for example, form partnerships with employers to provide basic skills training for their new hires, or to have ABE/ASE program completers be given preferential hiring opportunities.

26. **What proportion of adult basic education programs have formed partnerships with employers?** Are such linkages related to state policies? Do these programs have higher enrollment or completion rates than programs that do not have such linkages?

The 1998 Workforce Investment Act requires that states collect and report client outcome measures to assess the effectiveness of literacy programs and states' progress in improving literacy. The focus on these measures could lead programs to "cream"—to serve those adults who are most likely to be successful and that can be served most quickly and easily, rather than adults who may be less well educated, learning disabled, or otherwise harder to serve. It is important to track the nature of the population served by federal programs to ensure that such policies do not have an adverse impact on access:

27. **What changes (if any) are occurring in the nature of the clientele served by ABE/ASE programs that receive federal funds?**

At a time when the prison population is exploding in size, funds for prison education programs are being cut. Both the 1998 Perkins Act and the 1998 Workforce Investment Act abolished set-aside funds for prison education programs and changed minimum program allocations to maximum allocations.

28. **How are these new laws affecting the amounts spent within states on prison literacy programs?** What are the trends in prison literacy program funding, both in terms of overall funding levels and on a per-inmate basis?

Issues Concerning Basic Skill Demand and Skill Levels

In addition to the effects of policy, the demand for adult basic education services is complicated by a number of measurement, policy, and socio-psychological factors. On the measurement side, it is easy to determine whether someone has received a high school diploma, but not so easy to determine whether he or she is functionally literate or has a functional level of English-language skills. For example, estimates of U.S. illiteracy rates range from as low as four percent to as high as 40 percent, depending on the definition of "illiterate" used. Even within ED, decisions on how to assign individuals to literacy levels on the National Adult Literacy Survey (NALS) are under debate.[1]

Perceptions of skill levels and demand are also problematic measures. Data from the International Adult Literacy Survey (IALS) suggest that the American public tends to overestimate their skill levels; self-reports thus produce an undercount of the supply of skills. Employers' reports of skill demands, on the other hand, fluctuate with the state of the economy. For example, the number of companies reporting skilled worker shortages almost doubled between 1995 and 1998, from 27 percent to over 47 percent. The main reason for this apparent increase in skill shortages is that employment levels rose over this period,[1] bringing more low-skilled workers into the labor market. In short, when unemployment is high, employers can be more selective in their hiring and report few skill shortages—but when unemployment is low, employers must be less selective and, thus, report more skill shortages.

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[1] The two adult literacy assessments conducted by NCES set literacy levels using the criterion that the probability of passing an average item at a given level must be at least 80 percent; this criterion results in about 20 percent of adults falling in level 1, the lowest of 5 literacy levels. But NCES uses a 65–percent criterion in its K–12 assessments. Using that criterion on the NALS would result in about 15 percent falling at level 1. A 50–percent criterion, used in some other assessments, lowers the proportion at level 1 to below 10 percent.

29. **What is the level of basic skill acquisition in the U.S. adult population? What is the *perceived* skill level of the U.S. adult population?** That is, to what extent do American adults have a realistic assessment of their abilities and limitations? To what extent does an unrealistic assessment of basic skill attainment limit adults' efforts to seek further skill development?

30. **How can the level of basic skills in the adult population best be assessed and benchmarked to provide an accurate gauge of skill needs—one that is independent of labor cycles, yet takes into account job-skill demands?**

31. **How can we assess trends over time in basic skill attainment when the "basic skills" bar keeps getting higher (i.e., what counts as "basic" keeps increasing)?** Is it more important to use a consistent definition of functional literacy in order to maintain a trend line, or to modify the level of literacy considered functional in order to reflect changing demands placed on adults by society and work? How can these conflicting needs be balanced?

Regardless of the cut-off point for literacy levels, the fact remains that in international assessments, the U.S. population's literacy scores are more widely dispersed—including more adults at the highest and lowest ends of literacy—than those in most other countries.

32. **What accounts for the United States' relatively large proportion of low-literacy adults?** Why do we have relatively more adults in this group—is it a result of immigration? Of poverty? Of other factors?

Even as we struggle to measure reading literacy, the concept of literacy is being more broadly interpreted in recognition of the fact that adults need more than reading skills to be productive and successful citizens. Numeracy (the ability to manipulate numbers) was mentioned above as one aspect of literacy; other basic "life skills" that are being discussed under the literacy umbrella include problem-solving ability, interpersonal or teamwork skills, and computer skills.

33. **What is the range of skills that should be considered as part of adult literacy, adult basic skills, or life skills?** Which of these skills should be monitored over time? Can we set "functional" levels for these skills?

Basic-skill levels help determine the potential demand for ABE/ASE programs.[2] Likewise, English-language skills help determine the potential demand for ESL programs. There are obvious difficulties in determining the level of English proficiency among the American adult population.

34. **How can we accurately assess the need for ESL programs?** Are immigration rates an acceptable proxy for skill needs? Can these rates be accurately projected for estimating future demand?

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[1] From 1995 to 1998, the unemployment rate fell from 5.6 percent to 4.5 percent.

[2] Skill levels do not determine the *actual* demand for programs, since not all individuals with low skills are interested in participating in programs.

SECTION 6: INFORMAL AND AVOCATIONAL EDUCATION

As discussed in section 1, lifelong learning can be categorized as formal or informal, and as work-related or avocational (not work-related). According to the framework adopted for this task force, formal education is examined as part of section 3, Service Delivery in Education and Other Institutions, while work-related education is examined within section 4, The Education of Workers. Since the subjects of informal and avocational education are not well covered by either of those general topic areas (nor by this report's other topic areas), they are examined separately in this section.

Before discussing specific issues of relevance to informal and avocational education, it is useful to review the activities encompassed by these learning categories. As discussed in the Definitions of Terms section above, informal learning is distinguished from formal learning by the learning *process* (whether formal curricula and evaluations are used), while avocational is distinguished from work-related learning by the learner's *goals* (whether the intent is to develop job skills). As a result, informal and avocational learning are not mutually exclusive categories (see figure 1). Informal education can be either work-related or avocational in nature; avocational education can range from formal to informal. This section discusses both types of informal and avocational education, with a focus on formal avocational and informal work-related education.

Figure 1—Classification of Lifelong Learning Activities

	Process	
Goal	**Formal**	**Informal**
Work-related	College accounting course taken to improve job skills; high school carpentry class taken as career preparation	Workplace mentoring; following self-guided tutorial to use company's new software program at work
Avocational	College accounting course taken for "personal reasons"; high school carpentry class taken for "fun"	Guided field trip; following self-guided tutorial for new software for home use

BACKGROUND

Formal and *work-related* learning have been extensively studied. These types of learning lend themselves to systematic study because they typically occur in well-defined institutional settings. Formal education occurs almost exclusively in education institutions, or at "remote" sites under the auspices of an education institution. Work-related education occurs predominantly at education institutions (formal work-related education) and business establishments (both formal and informal work-related education).

Few data exist on informal and avocational learning activities. One reason informal and avocational education are less well studied is that they occur in a wide array of settings—one cannot examine either type of education by studying any single institution or organization, such as the formal education system or the workplace. In addition, institutional records (on participation, costs, etc.) that are often available to assess formal education are often not available for learning activities that are informal or avocational.

A second reason there are so few data on these topics is that informal and avocational education activities are difficult to observe, define, and measure. Informal education is difficult to empirically define because it encompasses a wide variety of experiences and interactions. In one sense, all of life (outside of formal schooling) is informal education, since we all learn through everyday experiences. Avocational education can also be difficult to define, simply because one cannot always tell whether an education activity is being pursued for vocational or avocational reasons. There are, however, theoretical definitions that can guide an assessment of policy issues in informal and avocational education. For this section, we use the theoretical definitions outlined in section 1. Refinement of these theoretical definitions to permit valid and reliable measurement will occur as part of this task force's later work.

A third reason informal and avocational education are less well studied is the lack of policy attention that has traditionally been given to these educational pursuits. It can be more difficult for federal policy to affect informal rather than formal learning experiences. It is less clear what role the federal government should play in education experiences that are not formally structured (informal) and/or not directly related to individuals' economic functioning (avocational). These factors encourage policymakers to place greater emphasis on formal learning than on informal learning, and on work-related than on avocational learning. Nonetheless, there is ample evidence showing that much of adult learning, including most of the learning that occurs at the worksite, is informal, and that avocational learning is an important route to developing an informed citizenry. Federal policy implicitly recognizes the importance of these learning areas in its broad education goals for adults. The 1991 National Adult Literacy Act, for example, defines "adult literacy" as follows:

> an individual's ability to read, write, and speak in English, and compute and solve problems at levels of proficiency necessary to function on the job *and in society, and to achieve one's goals and develop one's knowledge potential* (P.L. 102–73, § 37; [emphasis added]).

ED's National Goals panel has established the following goal in the area of adult literacy and lifelong learning:

> By the year 2000, every adult American will be literate and will possess the skills necessary to compete in a global economy *and exercise the rights and responsibilities* of *citizenship* [emphasis added].

More generally, we now recognize that adult learning is changing in ways that expand beyond the traditional model of "knowledge acquisition" in school followed by "knowledge application" at work. People are living longer and retiring sooner, the knowledge base in the arts and sciences is expanding at an ever-increasing pace, and the global economy and technological advances are requiring workers to develop new skills throughout their worklives. These trends suggest an increasing need for individuals to continue learning throughout adulthood. But given the high opportunity costs faced by working adults, it is often not feasible (or even necessary) for adults to invest their time and money in formal coursework. Also, as learning demands become more pervasive, it becomes increasingly important for adults to direct their own learning. In response to these demands, adult learning opportunities should become more prevalent and varied, as well as more linked to immediate needs, more learner-directed, and more accessible. If this trend holds, informal and avocational education should play an increasingly important role in the lives of American adults.

We now turn to specific issues. We focus first on issues that apply to both informal and avocational education. We then list issues that apply to informal education, to informal work-related education, and to avocational education.

SPECIFIC ISSUES

Issues Concerning both Informal and Avocational Education

Some basic policy questions concern both informal and avocational education. At present, we know little about how participation in these types of education differs from that in the more commonly studied areas of formal education and work-related education:

1. **Are the adults who participate in informal and avocational education different from those who participate in formal and work-related education?** Are informal learning activities more common among those who are more self-motivated learners? (If so, this could have major equity implications as informal learning becomes more critical to adult life.) To what extent is participation in avocational education restricted to those with more disposable income or time? (This also raises an equity issue, but in a less economically critical area.)

2. **Are the trends over time in participation in informal and avocational learning similar to or different from those for formal and work-related education?** Is technology advancing opportunities for informal and avocational learning more quickly than it is opportunities for formal and/or work-related learning?

During years of government budget-tightening, financial support for activities such as informal and avocational education may decline. Thus, in recent years there appears to have been an erosion of public support for many informal and avocational education providers, such as libraries and museums. State support for noncredit and avocational coursetaking has been withdrawn at many colleges and universities. At the same time, as more well–educated adults become part of the American demography, an "edutainment" industry is flourishing. Some businesses are finding that the "education angle" helps make their services and products more attractive to customers. So a grocery store may offer cooking classes, a sporting goods store may offer kayaking lessons, and so on. Even colleges and universities may "market" noncredit offerings as a means of increasing revenues. These trends suggest that we need to know more about opportunities for these types of education experiences.

3. **How is access to informal and avocational education changing as a result of these trends in public support and private interest?** To what extent are these forms of education becoming a commodity that is bought and sold (or used to sell other products) rather than a subsidized social benefit? What are the implications of changes in public support for informal and avocational education, particularly for access?

Finally, policymakers have often decried the lack of public understanding of science, history, and other disciplines that relate to responsible citizenship. While the foundations for this public understanding are established through the formal education system, informal and avocational education can serve as means for adults to expand and update this knowledge.

4. **What are the key areas of knowledge necessary for an informed adult citizenry, and what is the current level of knowledge in these key areas?** What sources of education do adults use to keep up-to-date in these knowledge areas, and which are perceived as

most useful and effective? Do some adults have more limited access than others to these important education sources?

Issues Concerning Informal Education

In past decades, education and training were often done "informally" through apprenticeships, mentoring, and on-the-job training. Today, these training methods are relied on less extensively, as formal training has substituted for informal training in many disciplines. It is easy to see this shift in the larger historical context of the last 100 to 200 years, but it is less easy to see in what manner formal and informal education are shifting today. To fully understand these shifts within the education and training system, one needs to monitor the trade-offs and interactions between formal and informal education.

5. **How much of adult learning is informal versus formal? In what situations and for what types of skill development is informal preferable to formal education?**

6. **What shifts are occurring in adults' participation in formal versus informal learning?** What is driving these shifts? Are there greater shifts among some types of education or skill development (e.g., basic skills) or for some groups rather than others (e.g., by socioeconomic status or race)?

7. **What is the relationship between participation in formal and informal education?** That is, are formal and informal education complementary or mutually reinforcing—do those with more of one type get more or less of the other type? For example, more educated workers receive the bulk of formal work-related education. Do they also receive more informal education, or is informal education more common among workers with less education and/or less formal training?

Formal education has one clear advantage over informal education—it typically produces greater knowledge gains in a shorter period of time (i.e., it is more efficient at producing learning gains). But adults often face numerous barriers when trying to take formal courses—scheduling conflicts with work, time commitments interfering with family life, travel time and distance, and high costs, to name some of the most common barriers. This suggests a need for informal education opportunities that can substitute for formal ones.

8. **How can effective informal education activities be developed and encouraged, particularly in areas of policy interest (e.g., work-related education, science and technology education)?** What is the role of employers, workers, education institutions, and the government in finding effective alternatives to traditional classroom learning for adults? What role can technology play in such an effort?

Issues Concerning Informal Work-Related Education

In the policy arena, high priority is placed on work-related education because of its presumed influence on individual, corporate, and societal productivity. Given this policy interest, we focus in this subsection on issues specific to informal work-related education. Additional issues concerning work-related education, both formal and informal, are listed in section 4, The Education of Workers.

Formal training involves large start-up costs that are difficult for small employers to recoup. So it is not surprising that small employers are less likely to offer formal training than are large employers. Recouping training costs is also more difficult when employees do not stay long with the company that provides the training. In fact, there is evidence that employers with higher employee turnover rates are less likely to offer formal training than those with lower turnover rates. These findings raise questions about the potential role of informal training when formal training is not feasible.

9. **Is informal training used as a substitute for formal training among employers for whom formal training is too costly?** In particular, do small employers and employers with high turnover rates substitute informal training for formal, or do they simply provide less training of any type for their employees?

Since informal training is generally less expensive than formal training, it may also be used in situations where workers' skills are in less demand or are more easily replaced.

10. **To what extent do employers provide informal versus formal work-related education based on their perceptions of skill demand?** That is, is formal training used more for high-demand skills and workers, while informal training is used more for low-demand skills and workers?

A variety of informal work-related training methods exist. Mentoring is a common method, as are self-paced tutorials, attendance at conferences and symposia, and participation in job circles.

11. **What informal training methods are used by employees, and which do employees (and their employers) find most useful or effective?** How can effective informal training methods be encouraged?

Work-skill development can focus on a variety of types of skills, any of which may be more or less amenable to acquisition through informal training. Workers typically require a mix of "hard skills" (technical and professional skills) and "soft skills" (interpersonal and organizational skills) in order to perform effectively in a work organization. They typically also need a mix of "generic" work skills, occupation- or industry-specific skills, and skills that are specific to their company. Finally, skill development can focus on initial skills training, retraining, skill updating, or career skill-building. Informal education is likely to play a different role for each of these types of training.

12. **To what extent do employees rely on formal versus informal training to develop each of the following types of skills: generic soft skills, generic hard skills, industry-specific soft skills, industry-specific hard skills, company-specific soft skills, and company-specific hard skills?**

13. **To what extent are formal and informal training used for initial skill training, retraining, skill updating, and career skill-building?**

Issues Concerning Avocational Education

Avocational education constitutes a relatively large proportion of all adult education, and anecdotal evidence suggests that avocational education is on the rise. If true, this may reflect (1) an increase in the time and/or money adults have for recreational activities, (2) a larger cohort of middle-aged adults (the Baby Boom generation), (3) an increased number of retired adults, and/or (4) increased access to avocational education opportunities as colleges and other institutions tap this older, more well-educated market. Other factors may be operating as well.

For example, the greater complexity of personal finances, communication technologies, and health and medical options have increased demand for knowledge on these topics.

Knowing what types of avocational education are taken and the reasons for engaging in these activities also can provide valuable information for the formal education system. Of particular interest are avocational education courses that help adults manage their daily lives (e.g., financial or health management). In such cases, the nature of avocational pursuits may suggest changes needed in the formal education system to address emerging adult needs that cannot easily be met elsewhere. We need to know more about what avocational learning activities adults pursue and why.

14. **In what types of avocational learning do adults participate (e.g., recreational/ sports, cultural/educational, health-related, life/home management)?**

15. **What role does avocational education play in adults' lives?** What contribution does it make to improving one's quality of life, building or maintaining family relationships, enhancing personal and social well-being, and promoting responsible citizenry (e.g., voting behavior)?

Formal avocational learning is also of policy interest because, along with formal work-related learning, it contributes to the expanding education sector of the American economy. It is widely acknowledged that as the cohort of college-aged students has shrunk in recent years, postsecondary institutions have increasingly marketed both vocational and avocational offerings to older adults. These courses are often offered as noncredit courses.

16. **To what extent do adults take avocational courses—both for-credit and noncredit—at formal institutions?** What is the incidence of for-credit and noncredit avocational coursetaking at formal institutions?

MEASUREMENT ISSUES

A number of measurement issues are raised by the research questions listed above.

17. **What informal learning activities are (1) worth measuring and (2) capable of being validly and reliably measured?** How do we measure something that is normally considered "part of everyday life" and therefore not distinct enough to be remembered as an "event"? Similarly, how can we measure informal learning in the workplace, when it may include conversations, Internet searches, and other easy-access methods that people don't typically think of when recalling learning experiences?

18. **What avocational learning activities are worth measuring?** Since many avocational learning activities are informal, the issues underlying the measurement of informal activities also apply to avocational activities.

19. **Can avocational learning activities be categorized in ways that are useful for understanding their role in citizenship and adult life in general?**

20. **How do we distinguish informal or avocational learning from "entertainment"?** Does it make sense to make a distinction between education activities that do or do not have an entertainment component?

21. **Can we measure the effectiveness or productivity of informal versus formal work-related education?** Should we expect them to have the same effect on productivity (or to provide equivalent returns to education)?

SECTION 7: INSTRUCTIONAL DELIVERY USING NEW TECHNOLOGIES

Technology has the potential to transform adult learning much as it is transforming the workplace; personal computers, computer networks, and telecommunication technologies can provide alternative delivery systems that overcome the most common barriers to adult learning. In this section, we examine the potential impact of new technologies on adult learning opportunities. Many aspects of technology's impact and potential have been discussed in other sections within the context of specific types of lifelong learning, such as adult basic education. In this section, we focus on issues related to the use of new technologies as instructional delivery devices.

BACKGROUND

There are many reasons why new technologies have particular potential as delivery systems for adult learning. First, new technologies allow instructional activities to overcome many of the access barriers that predominantly impede adults. The most common barrier adults face to learning is opportunity costs; new technologies minimize these costs by allowing instruction to be offered at more convenient times and locations, including, in some cases, at times and places selected at the discretion of the learner. Second, the delivery modes characteristic of new technologies are well suited to the learning styles and needs of adults. These modes of instruction often require a more mature learner who is able to work independently; the socialization goals that make human interaction so critical to the education of youth are also usually absent from adult education. New technologies are also especially well designed for providing the targeted, short instruction that adults often seek. Finally, the existing modest infrastructure that characterizes much of adult education makes it easier to adopt new delivery systems, including new technologies.

But promises of revolutionized learning from technologies in the past (e.g., radio and television) have proven to be largely unrealized. Three reasons have been advanced for the lack of technological impact, at least within education institutions. First, people are social animals. We tend to value social interaction and to have strong psychological resistance to changing or eliminating common patterns of interaction. For example, the retail industry could eliminate 20 million sales jobs in the next 10 years if all sales were handled electronically. Whether this happens will depend on consumers' preferences for interacting with sales personnel (and products) electronically versus physically. The same issue applies to the delivery of instructional services, where the physical presence of an instructor and peers is often considered a valuable, if not critically important part, of the learning experience. Second, many education institutions, particularly traditional colleges and universities, are deeply conservative about changing their structure and operation. Finally, the profit motive that drives innovation and change in the business sector does not serve as an incentive for education institutions to adopt new technologies or delivery methods. (The profit motive may, however, help drive employers and private-education vendors to do so.)

In addition to these general psychological and institutional barriers (which may be eroding over time), there are other, more idiosyncratic factors that limit the spread of technology-based instructional systems. First, technology is merely a tool for delivering instruction; without high quality software and technology-based curricula, the newest technologies are instructionally useless (except as a means of providing information). Second, new technologies are costly to purchase and install, require trained technical staff to operate, and have a short life expectancy due to the fast pace of technological innovation. As a result, only organizations that have a large pool of trainees currently find it cost-effective to use this method of instruction. Third, some skills still appear to be better taught in a traditional classroom situation; teamwork and interpersonal skills, for example, would seem to require that at least some instruction involve personal interactions.

New technologies could overcome many or all of these barriers. The greater interactivity of new technologies minimizes psychological resistance to their use. New technologies also appear to be expanding the education market to new providers that are not as resistant to innovative change and that are more influenced by the profit motive. Costs continue to go down as technology becomes more available for a wide range of uses. And the availability of software and curricula, while inevitably lagging behind hardware development, is certain to improve, particularly as the education market expands.

Instructional Uses of New Technology

There are a number of ways in which new technologies can be (and are) used to deliver instruction. Some of the most common are as follows:

- *Use of Internet or Intranet to provide instruction:* Computer networks allow (1) the widespread dissemination of materials, (2) constant and easy updating of curriculum materials, and (3) group interaction in written form. The U.S. Department of Education (ED) has funded a collaborative effort to develop a video, Internet, and computer-based education program to help adults improve their literacy skills and obtain a GED diploma. *LiteracyLink* will use visual icon-driven menus and audio instructions to guide learners through an on-line program.

- *Use of video technologies to provide instruction:* Television and videos, although not "new" technologies, have the advantage of being relatively inexpensive and widely available. In collaboration with the Public Broadcasting System (PBS), ED has developed a 26-episode PBS video series, *Crossroads Café*, to deliver ESL instruction to adults in their homes. Video technologies can also be used to provide a modern-day version of the correspondence course.

- *Distance education:* Distance education offers remote-site instruction using satellite TV or other telecommunications formats. Instruction is offered in real time, with various levels of interaction depending on the technologies used. Distance education allows education institutions to reach students beyond the confines of a limited delivery area. Entire distance education universities have been established, the most notable being Western Governors University, serving residents in the rural, sparsely populated western states.

- *Computerized assessment and instruction:* Computer programs can tailor the presentation of instructional or assessment material to the learning ability of the student, allowing for more efficient use of time and more efficient learning.

- *Informal education*: Internet, computer, and telecommunications technologies offer quick and easy access to a wealth of information. These technologies can be used informally by adult learners seeking information and instruction at home, at work, or wherever they have access to the appropriate technology.

Finally, many issues concerning the instructional uses of new technologies revolve around the advantages and disadvantages, or incentives and disincentives, of these delivery mechanisms. Before addressing specific issues, it is useful to review these incentive systems from the point of view of the individual student and the instructional provider.

Incentives for the individual student to use new technologies are as follows:

- new technologies can eliminate or reduce time barriers and scheduling problems, and minimize opportunity costs;
- new technologies can eliminate or reduce location barriers, including travel costs and time, and child care needs; and
- new technologies can provide more individualized instruction, allowing for more efficient use of time and progress.

Disincentives for the individual student to use new technologies are as follows:

- the student may miss the "human touch";
- the student may not have proper motivation for self-directed learning;
- the student may not be comfortable or familiar with new technologies;
- instruction may be less adaptable to individual learning styles and needs; and
- instruction may be less insulated from interruptions.

Incentives for the provider to use new technologies are as follows:

- new technologies provide a faster, more efficient delivery of information;
- new technologies can reduce time away from the job;
- new technologies can reach more students;
- new technologies can reach students at distant locations (useful for multi-site employers); and
- new technologies can eliminate the cost of paying instructors.

Disincentives for the provider to use new technologies are as follows:

- there are relatively expensive start-up costs;
- technology maintenance and replacement/up-date costs can be high;
- there is an increased need for technical expertise; and
- costs and technical requirements limit feasibility to large training pools (infeasible for many employers).

We now turn to particular issues that concern the following aspects of the instructional uses of new technologies: access, offerings and informal applications, and incentives and outcomes. We end with a note on corporate universities, which may provide a useful model for others interested in the instructional uses of new technologies.

SPECIFIC ISSUES

Access Issues

Discussions of technology's role in education often assume that everyone has access to, can use, and wants to use new technologies. In fact, 50 percent of all households do not have a computer, and 67 percent of adults do not use a computer at work. It is likely that more adults are interested in using computers, but some—particularly older adults—may be hesitant to do so. There are also significant disparities by education level and race/ethnicity in computer use, both at home and at work. The computer is predominantly a white-collar work tool. And in spite of their plummeting prices, computers are still too expensive for most low-income families. Thus, efforts to use new technologies for instructional purposes must address some fundamental access issues.

1. **How many adults, and which adults, are comfortable and familiar with computers?** What is the attitude of adults about learning in person versus via new technologies? What is the attitude of those who have never used computers toward using them for learning?

If technology is to eliminate the time and space barriers faced by many adults, computer or telecommunications equipment must be available in adults' homes or workplaces.

2. **How many adults, and which adults, have access to computers, satellite or cable TV, VCRs, and other potential instructional delivery devices in their home, or at their workplace?**

For many adults, particularly those who are poor and uneducated, access to advanced technology at home or in the workplace is likely to be limited. For these adults, it may be most feasible to reduce time and space barriers by providing instructional technology in local schools, community centers, or other local instructional sites.

3. **What proportion of elementary and secondary schools, libraries, and community-based organizations have advanced technologies that are capable of instructional delivery?** What is the rate of penetration in urban and rural areas, where access is most likely to be a problem?

To increase access to the Internet within the education system, the federal government subsidizes the costs of Internet connections for public elementary and secondary schools through the "E-Rate discount," a discounted connection rate offered through the Federal Communications Commission (FCC).

4. **How many and which schools have taken advantage of the E-Rate? What proportion of these schools serve adult learners?** What proportion currently use new technologies to serve adults?

Issues Concerning Offerings and Informal Applications

It is difficult to fully capture access and offerings by collecting information from instructional providers, both because cooperative arrangements make it difficult to distinguish providers, and because a wide range of public and private institutions are moving into this market. So the place to start is with individual adults.

5. **What proportion of adults (and which adults) have participated in an education activity utilizing a technology-based delivery system?** What types of technologies were used? On what types of skill development did the instruction focus? Who offered the instruction?

In spite of the limited representation of employers and postsecondary institutions, it is still useful to examine offerings provided by these institutions, since these two groups provide the majority of adult education offerings. And much more information about offerings can be obtained from course providers than from adult learners.

6. **What proportion of employers offer their employees technology-based training activities?** What types of technology-based delivery systems are used? For what types of skills is such training offered? How many employees are reached?

7. **What are the characteristics of employers that offer technology-based instruction,** particularly along dimensions that are believed to affect the tendency to provide such offerings (such as the extent to which technology is used in the production process, the distribution/accessibility of employees, number of employees, level of training needs)?

8. **What proportion of postsecondary institutions offer technology-based instructional courses?** What types of technology-based delivery systems are used? To whom are these courses targeted (e.g., workers seeking new skills, professionals in continuing education, students in remote areas, ESL students)? How many students are reached?

9. **What are the characteristics of postsecondary institutions that offer technology-based instruction,** particularly along dimensions that are believed to affect the tendency to provide such offerings (such as location, type of institution)?

10. **When employers or postsecondary institutions provide distance education offerings, to what remote sites do they deliver instruction** (students' homes, other worksites or campuses, elementary and secondary schools, etc.)?

11. **How is the development and operation of these offerings funded by employers and by postsecondary institutions?**

Because the costs of using new technologies for instructional purposes is so high, many institutions have chosen to share costs with collaborating or partnership institutions. In most cases, strategic partnerships are formed between agencies that serve as content providers (curriculum specialists) and those that serve as controllers of distribution channels (delivery specialists).

12. **How many of these providers develop both the curriculum and instructional delivery system on their own?** How many providers use outside agencies or vendors for curriculum development, for instructor training, or for development and implementation of delivery system? What types of outside agencies or vendors are used?

13. **What are employers' and postsecondary institutions' main reasons or goals for offering courses using new technologies?** (For example, some reasons might include to reduce students' time constraints; to increase availability through convenient locations, to reduce instructional costs, or to improve quality of offerings.)

The introduction of new technologies into the workplace, schools, and homes increases opportunities for learning outside of formal institutions and without formal instructional programs.

14. **What proportion of workers use the Internet as an informal on-the-job learning tool?** How often do they use it? In which occupations are the workers who use the Internet this way? How helpful do workers view the Internet in improving their job performance or effectiveness?

15. **What proportion of adults use new technologies at home specifically to acquire new knowledge or skills?** Which technologies do they use (including satellite and cable TV,

CD-ROM programs, etc.), and how frequently do they use them? Which do they find most effective?

Issues Concerning Incentives and Outcomes

16. **What motivates employers to offer instruction via new technologies?** What incentives do employers/postsecondary institutions report for using technology-based instruction?

17. **What inhibits employers from offering instruction via new technologies?** What disincentives do employers report for this method of instruction? To what extent is the lack of appropriate curricula/software viewed as a disincentive to the instructional use of new technologies?

18. **How do adults who have learned from each type of technology-based delivery system view the learning experience?** What strengths and weaknesses do they perceive each delivery system to have? How effective do they find it for their learning purposes?

19. **How do employers and postsecondary institutions that have used them view the effectiveness these delivery systems?** What strengths and weaknesses do they perceive each delivery system to have?

As mentioned above, ED has helped fund two adult education programs using video and (in one case) computer technologies.

20. **How many adults are being reached by these federal efforts? How effective are these instructional programs in achieving learning gains?** Could these programs serve as a model for other efforts?

Technology has the potential to make adult learning more individualized. This is particularly true of programs that are more informal in nature. This is good in many ways, but it may also mean that it falls increasingly on the learner to be self-motivated enough to utilize these learning opportunities (rather than participating in a mandatory worker-training course, for example), and to complete such education on his or her own. This method of instruction may prove more difficult for learners who are less self-motivated.

21. **What is students' rate of completion of technology-based programs**, both programs that are formally administered (with standard meeting times and evaluation criteria) and informally administered (self-paced, with limited or no evaluation)?

As discussed above, the curriculum content is a critical element in making a technology-based (or any other) instructional system work. But curriculum content is often overlooked in the excitement over the "possibilities" of technological innovations.

22. **How satisfied are employers, postsecondary institutions, and students with the curricula of offerings provided via new technologies?**

MEASUREMENT ISSUES

The emergence of new providers has been made possible by the use of technologies that allow providers to enter markets that were previously closed to them. In addition, the use of new technologies forces the separation of the delivery mechanism for instruction from the content (curriculum), allowing each to function as an independent commercial product. There is anecdotal evidence to suggest that new providers are stepping in to offer these services. Unfortunately, while we have mechanisms for collecting information from students, education institutions, and employers, we have no mechanism for collecting data from private vendors specializing in educational hardware and software.

23. **How can we find out who is developing new technology delivery systems and the curricula for these systems? How can we collect information on the wide range of private education vendors that is emerging?** Are lists of employers by product (such as educational hardware and software) available to use as a sampling frame?

24. **How can we measure the growth in and nature of partnerships between curricular experts (education institutions), delivery providers (technology companies), and/or the agency offering the instruction (typically an employer or postsecondary institution)?**

The self-paced, asynchronous nature of learning made possible by new technologies makes it more difficult to determine when learning begins and ends, and to determine the intensity (time) of instruction.

25. **How can we measure the intensity, completion rates, or other such characteristics for instruction offered through new technologies** (other than those that follow a formal classroom model of instructional delivery)?

A NOTE ON CORPORATE UNIVERSITIES

There are currently about 1,000 corporate universities in the United States. Many of these corporate universities are sponsored by high-tech firms such as Motorola, Oracle, and Sun Microsystems. High-tech firms have a number of incentives to develop worker training programs, particularly those that utilize new technologies. First, these firms already work with technology; it's "what they do." This means that they are likely to know how to use technologies effectively and in an innovative manner, and that they need not spend a lot of money to obtain the requisite technology for instruction (they use what they have). Second, keen competition in a fast-changing field makes high-tech firms highly motivated to keep their workers up-to-date. But traditional instructional formats may be less adaptable to quickly changing curricular demands than are more innovative formats, such as Internet and Intranet. Many of these firms are also international in scope and, thus, need to reach workers at many sites; it is more cost-effective to do so with technology. Sun Microsystems, for example, has found their corporate university, SunU, to be an effective and efficient means of delivering training to employees around the world (although most of SunU's training is still traditional classroom training). It would appear (in the absence of hard data) that these organizations have made advanced efforts in the use of instructional technology. This makes it reasonable to ask the following question:

26. **Can the lessons learned about the instructional uses of technology from the experiences of high-tech (and other?) corporate universities be transferred to the public sector?**

Appendix E:
Prioritized Issues List

The following criteria were used to prioritize issues as high, medium, and low priority:

- Measurable through surveys
- Relevance to NCES mission
- Relevance to policymaking (including feedback from TRP)
- Number of individuals affected or costs involved

Two caveats must be given about this prioritization. First, because the issues must be measurable and relevant to NCES' mission, many important issues were not rated as high priority. For example, the issue of why ABE participants leave these programs so early is unequivocally important, but it is not the type of issue that is well-addressed by surveys, and it is more appropriately addressed by other offices in the Department of Education that *evaluate* programs, rather than by NCES. Second, this prioritization reflects the work of the Lifelong Learning Team, and has not been endorsed by NCES management. This work-in-progress should not be distributed, nor should it be interpreted to reflect the Center's views.

1. THE ADULT POPULATION

High-Priority Issues

1a. ***What are the education attainment levels of the adult population?*** *What is the trend in education attainment over time?*

1b. ***What is the age composition and racial/ethnic composition of the adult population, and what are the education attainment levels of these sectors of the population?*** *What are the trends in these population characteristics?*

1c. *What proportion of the adult population is learning disabled?*

1d. ***How many adults, and which adults, use computers at home or at their workplace?*** *What are the trends over time in the use of computers by adults at home and at work?*

Medium-Priority Issues

No issues in this area identified as medium priority.

Low-Priority Issues

1e. ***How do individuals move from compulsory education (the role of student) to adult roles?*** *How do adults combine work, family life, and education? What trends are occurring in these life patterns?*

1f. ***What percentage of the adult population can be described as*** **alienated** ***from the learning process?*** *What can we learn about this group that may help reach them?*

2. LEARNING ATTITUDES AND SKILLS OF ADULTS

High-Priority Issues

2a. *To what extent do adults* **recognize the need** *to be continuous learners?*

2b. *What are adults' perceptions of the* **value** *of lifelong learning activities for their own lives?*

2c. ***To what extent do adults feel they have the skills and knowledge they need to function effectively at their current job and for the job they would like to have in the future?*** *To what extent are adults comfortable with their skill levels?*

2d. ***To what extent are adults, particularly workers, satisfied with existing opportunities to improve their education and skills?*** *What changes would they like to see in these opportunities?*

2e. ***What types of skills and knowledge do adults, particularly workers, seek to acquire through adult learning?*** *What are the trends in the types of knowledge/ skill development received?*

2e1. ***How generic or transferable is the education and training that workers receive?*** *To what extent do workers perceive the education and training they receive to be useful for other jobs in their company, and/or for jobs in other companies?*

2f. ***What is the level of basic skills in the adult population?*** *What are the trends over time in skill levels?*

Medium-Priority Issues

2g. ***What are adults' perceptions of their basic skill levels?*** *That is, to what extent do adults have a realistic assessment of their abilities and limitations? To what extent might an unrealistic assessment of basic skill attainment limit adults' efforts to seek further skill development?*

Low-Priority Issues

2h. *What are the key areas of knowledge necessary for an informed adult citizenry, and what is the current level of knowledge in these key areas?*

2i. *To what extent is the demand for ABE/ASE programs affected by the rate of learning disabilities in the adult population? Is the demand for ABE/ASE programs declining as public schools improve their special education services (assuming such improvements are occurring)?*

2j. ***What accounts for the relatively large proportion of low-literacy adults in the U.S. (relative to other countries)?*** *To what extent is the relatively large number of adults in this group due to immigration, poverty, or other factors?*

3. LABOR MARKET DEMANDS FOR ADULT LEARNING

High-Priority Issues

3a. ***What skills are used in the labor market, and to what extent is the learning of new skills or knowledge characteristic of jobs in the labor market?*** *What are the trends in the use of skills and learning, overall and within specific jobs that dominate the economy? What are the trends in the use of specific types of skills or learning? Are skill or learning becoming more polarized over time?*

> 3a1. ***To what extent are occupations characterized by continuous skill development?*** *Do occupations that have higher initial education demands also have higher continuing education demands? What is the trend over time in the need for continuous skill development (particularly in high-tech occupations)?*
>
> 3a2. ***What is the job composition of the labor market, by skill or education requirements?*** *To what extent is the mix of skills required in the labor market changing—in general, and in particular occupation or industry areas?*
>
> 3a3. ***What types of skills and learning are increasing and decreasing in demand?***
>
> 3a4. ***To what extent do workers report that the skill, knowledge, and learning requirements for particular occupations are changing?*** *To what do workers attribute these changes?*

3b. ***To what extent are the skills and knowledge required of workers specific to an individual employer, occupation or industry, or generic in nature?***

3c. ***To what extent do workers rely on (use) skills and knowledge acquired through formal education, rather than skills and knowledge acquired within the work context***?

Medium-Priority Issues

3d. ***To what extent is there a "skills gap"?*** *What is the trend in the relationship between the supply of skills and the demand for skills (i.e., in latent or unmet demand)?*

3e. ***How is the workplace changing in ways that affect the demand for skills?*** *To what extent are employers adopting competitive strategies that are based on learning and investment in human capital (e.g., working in teams, decentralized decision-making)? To what extent are they adopting strategies that may reduce their incentive to invest in worker training (e.g., use of a contingent workforce, downsizing)?*

3f. ***To what extent does employer-sponsored training (compared to other worker training) focus on generic work skills, occupation-specific skills, and company-specific skills?***

Low-Priority Issues

3g. ***To what extent are employers satisfied with the skill levels of the workforce?***

3h. ***How are computers and other new technologies changing the skill requirements for workers?***

3i. ***What are the strategies employers use to ensure that workers have job skills when hired and that workers maintain their job skills during tenure?*** *To what extent do employers rely on informal training methods, in-house training, use of outside vendors, etc.?*

3j. ***What factors inhibit employers from offering more training than they currently do?*** *(e.g., market instability, perceived lack of training needs, high employee turnover, economies of scale)*

3k. ***What proportion of the knowledge and skills used by workers in various occupations are contextual (applied, "hard") versus conceptual (theoretical, abstract, "soft")?***

3l. ***To what extent do workers (particularly those in the service sector) receive education and training related to communication/interpersonal skills?***

4. PARTICIPATION LEVELS AND PATTERNS

High-Priority Issues

4a. ***How many, and what proportion of adults participate in lifelong learning activities?*** *In other words, what is the extent of participation, and what is the incidence rate for participation in lifelong learning?*

4b. ***How much time do adults devote to each lifelong learning activity?*** *In other words, what is the intensity of participation in lifelong learning activities? Do incidence and intensity rates suggest different levels of participation?*

4c. ***Which adults participate in lifelong learning activities and which do not?*** *Do participation patterns vary among groups of policy interest? How do participation rates vary across the adult lifespan?*

> 4c1. ***Which adults participate in each type of learning—formal, informal, work-related, and avocational?*** *Are informal learning activities more common among those who are more self-motivated learners?*

4d. ***What are the trends over time in participation in lifelong learning?*** *Are there groups of adults for which these learning activities are becoming more or less popular? Are participation trends similar for different types of adult education?*

> 4d1. ***What are the trends in participation by adults in particular age-cohorts and at particular education attainment levels?***
>
> 4d2. ***What are the trends in participation for each type of learning (formal, informal, work-related, and avocational)?***

4e. ***How extensive are enrollments of part-time and adult students at postsecondary institutions?*** *What trends are occurring in these enrollments?*

4f. ***What are the characteristics of ABE/ASE-eligible adults who are not interested in participating in these programs (versus those who are interested)?*** *What are the characteristics of ESL-eligible adults who are not interested in participating in these programs?*

Medium-Priority Issues

4g. ***Which workers receive various types of employer-sponsored training, and for what purposes?***

Low-Priority Issues

4h. ***What are the patterns of movement into and out of lifelong learning?*** *Are there key life events that trigger or hinder participation?*

4i. ***To what extent is participation (particularly in avocational education) restricted to those with more disposable income or time?***

4j. ***What proportion of workers use the Internet as an informal on-the-job learning tool?*** *How often do they use it?*

4k. ***How many adults are reached by the two technology-based federal adult education efforts (Crossroads Cafe and LiteracyLink)?***

5. GOALS, INCENTIVES, AND DISINCENTIVES

High-Priority Issues

5a. ***What are adults' goals or reasons for participating in adult learning activities?*** *What proportion of their learning is for work-related versus avocational reasons? Of work-related learning, what proportion is taken for initial or qualifying training, retraining, skill upgrading, or career advancement?*

> 5a1. ***What are adults'*** *educational* ***goals when they participate in adult learning?*** *What proportion of adults intend to earn a degree or other credential? What type of credential do they seek? (e.g., postsecondary certificate, company certificate, state or professional license)*
>
> 5a2. ***What are adults' reasons for engaging in work-related learning?*** *What proportion is undertaken as a proactive effort to increase earnings or job status versus as a reactive effort to maintain a current job? What proportion is undertaken in response to technological or organizational change, or to job loss?*

5b. ***What are the incentives and disincentives to participation in lifelong learning activities that influence the behavior of adults (including participants, interested non-participants, and uninterested nonparticipants)****? To what extent is participation limited by a lack of incentives rather than by disincentives?*

> 5b1. ***Among those interested in participating in adult basic education programs, what benefits are perceived to accrue from participation, and what costs or other hindrances (e.g., lack of self-confidence) outweigh those benefits?*** *Among those not interested in participating, what factors contribute to the perception that programs offer no benefits?*
>
> 5b2. ***What are the motivating factors (incentives) among those who participate in each type of adult basic education program (ABE, ASE, ESL)?***

Medium-Priority Issues

5c. ***To what extent are adults*** *motivated* ***to continue learning?*** *To what extent can a lack of motivation be attributed to personal, situational, or program characteristics?*

5d. ***In what types of avocational learning do adults participate (e.g., recreationall sports, cultural, health-related, lifelhome management)?***

Low-Priority Issues

5e. ***What factors motivate employers to adopt competitive strategies that are based on learning and investment in human capital?***

5f. ***What are employers' and postsecondary institutions' main reasons for offering courses using new technologies?*** *(e.g., to reduce students' time constraints, to increase availability, to reduce instructional costs, to improve quality of offerings) What disincentives (e.g., lack of appropriate curricula/software) do providers report for this method of instruction?*

5g. ***What factors motivate states and localities to offer one type of adult literacy program over another (e.g., family vs. workplace literacy)?*** *To what extent are their decisions driven by legislative regulations, demand, past program success, or other factors?*

5h. ***What role does avocational education play in adults' lives?*** *What is its connection to quality-of-life, building or maintaining family relationships, personal and social well being, and responsible citizenry?*

5i. ***To what extent and under what circumstances do adults view work-related learning as an opportunity or a burden?***

5j. ***To what extent is worker education and training viewed as an integral aspect of work performance and the reward system within a company?*** *How often is worker skill development an explicit corporate objective? How many employers have training policies, training staff, or training facilities?*

5k. ***What working conditions facilitate or impede the sharing of skills and knowledge through "communities of practice" (worksites) or "occupational communities" (professional or occupational groups)?***

5l. ***To what extent is interest in adult literacy or ESL programs affected by the site providing the instruction?*** *Are programs offered by education institutions of less interest to the target ABE population than are other providers, since these adults have already met with failure in the education system? Are programs offered by education institutions of* more *interest to the target ESL population than are other providers?*

5m. ***Do adults who are alienated from the learning process have a preference for certain types of providers—e.g., church groups rather than local schools, community-based organizations rather than community colleges?***

6. INVESTMENTS IN ADULT LEARNING

High-Priority Issues

6a. ***Who pays the financial costs for adults' participation in learning activities (particularly work-related activities)—what are the financial costs to individuals, employers, labor unions, federal or other government agencies?***

> 6a1. ***How much do participants pay to participate in adult learning activities, particularly in adult basic education programs, and what do these participant costs cover (transportation, childcare, book or supplies, etc.)?***

6a2. ***How often and to what extent do employers invest in workforce training, and what are the trends over time in employers' investment in workforce training?***

6b. ***How do adult learners finance their education activities?***

6c. ***How much and what types of employer support and incentives are offered for adult learning activities (e.g., granting time off, linking bonuses or raises to education or training, partnerships with education institutions, training stipends, tuition reimbursements)?***

Medium-Priority Issues

No issues in this area identified as medium priority.

Low-Priority Issues

6d. ***Are the training costs borne by employees and employers proportional to the benefits each receives?***

6e. ***How do providers (particularly employers and postsecondary institutions) fund the development and operation of distance education offerings?***

6f. ***Could tuition charges for ABE/literacy programs provide an added incentive for program completion—and, if so, with what effect on program access?***

7. ADULT LEARNING PROVIDERS

High-Priority Issues

7a. ***What organizations (1) offer learning activities for adults, (2) fund learning activities for adults, and (3) provide curricula for adult learning activities?*** *In other words, who is the site provider, the funding provider, and the curriculum provider—particularly for adult basic education and work-related education? Who is moving into and out of each of these markets?*

7b. ***How extensive a role do formal education institutions and employers play in the provision of adult learning activities? How are these roles changing over time?***

7b1. ***What is the role of postsecondary institutions, overall and by institutional type, in the larger service delivery system for adults?*** *What proportion of adult learners do they serve, and which learners do they serve? What is their role in the provision of adult basic education, work-related education, and a vocational education for adults?*

7b2. ***Are employers offering more or less training to employees now compared to in the past?*** *If less, are employees making up for that training loss elsewhere?*

7c. ***Where do workers get their education and training?*** *What proportion of worker education is provided by employers, labor unions, or higher education? What proportion is provided by collaborations of these groups?*

7d. ***For each type of adult basic education program (ABE, ASE, ESL), what proportion of the teaching force is voluntary versus paid staff, and full-time versus part-time staff?***

7e. ***What proportion of the adult basic education teaching force has formal education training?*** *What proportion has formal training to educate adults?*

> 7e1. ***What proportion of the adult basic education teaching force has formal training in diagnosing and instructing students with learning disabilities?*** *How well prepared are adult education instructors to adapt teaching for students with learning disabilities?*
>
> 7e2. ***What proportion of the adult basic education teaching force has formal training in alternative learning styles and instructional methods?*** *How well prepared are adult education instructors to adapt their teaching to adults' learning styles?*

Medium-Priority Issues

7f. ***What are the characteristics of employers that offer technology-based instruction?*** *(e.g., extent to which technology is used in the production process, distribution/accessibility of employees, number of employees, level of training need)*

7g. ***To what extent do adults take avocational courses—both for-credit and noncredit—at formal institutions?*** *What is the incidence of for-credit and noncredit avocational coursetaking at formal institutions?*

Low-Priority Issues

7h. ***How prevalent are geographic "learning communities"?*** *More generally, how available are formal and informal learning resources to adults in various types of communities?*

7i. ***What sources of education and training do adults use to keep up-to-date in key knowledge areas, and which are perceived to be most useful and effective?*** *Do some adults have more limited access than others to the most useful education and training sources?*

7j. ***How do workers view the role of community colleges as a provider of worker education and training?***

7k. ***How many and which schools have taken advantage of the E-rate for Internet connection?*** *What proportion of these schools serve adult learners? What proportion use new technologies to serve adults?*

8. INSTRUCTIONAL DELIVERY AND NEW TECHNOLOGIES

High-Priority Issues

8a. ***What instructional delivery methods are used in adult learning activities?*** *To what extent are new technologies (including the Internet, CD-ROMs, other computer-based systems, and telecommunications) used as a delivery mechanism for adult learning?*

8b. ***How are technology-based instructional programs developed and offered?*** *How many organizations that offer technology-based instruction for adults provide both the curriculum and instructional delivery system? How many use outside vendors for curriculum development? For instructors or instructor training? For delivery system implementation?*

> 8b1. ***What are the trends in the use of computer and telecommunication technologies as a means of delivering instruction in adult learning?***

8c. ***What proportion of adults use new technologies at home specifically to acquire new knowledge or skills?*** *Which technologies do they use, and how frequently do they use them?*

8d. ***How many adults, and which adults, have participated in an adult learning activity utilizing a technology-based delivery system?***

> 8d1. ***How many adults are enrolled in adult basic education programs that use computer or telecommunications technologies?***

8e. ***What proportion of employers offer their employees technology-based instructional activities?*** *What types of technology-based delivery systems are used?*

8f. ***What proportion of postsecondary institutions offer technology-based courses for adults?*** *What types of technology-based delivery systems are used? To which groups of adults (e.g., workers seeking new skills, professionals in continuing education, adults in remote areas, ESL adults) are these courses targeted?*

> 8f1. *What are the characteristics of postsecondary institutions that offer technology-based instructional programs (e.g., location, type of institution)?*

8g. ***How many postsecondary institutions (and corporate universities) offer distance education programs, and how many adults participate in these programs?*** *To what remote sites is distance education delivered? (e.g., students' homes, branch worksites or campuses, elementary or secondary schools) To what populations is it targeted?*

8h. ***What proportion of potential providers (such as schools, postsecondary institutions, libraries, and community-based organizations) have advanced technologies that are capable of instructional delivery?***

Medium-Priority Issues

8i. ***To what extent are computers and new telecommunication technologies used as instructional support devices (i.e., for administrative purposes, learning tools) by adult learning providers?***

8j. ***To what extent do alternative offerings and delivery methods (e.g., distance education, customized training, worksite-based training, etc.) increase access to learning opportunities?***

Low-Priority Issues

8k. ***What proportion of employer-provided training is offered on-site during work hours (i.e., at a time and place most convenient for workers)?***

8l. ***What strategies do high-tech firms use for worker training and education?*** *Are employers' training strategies becoming polarized as a result of polarization in job-skill requirements?*

8m. ***To what extent do workers rely on their coworkers for contextual knowledge and skills?*** *To what extent do workers believe their worksite is characterized by "knowledge sharing" versus "knowledge hoarding"?*

8n. ***What are the trends in market segmentation for ABE instruction (e.g., family literacy, workplace literacy)?*** *Does market segmentation lead to increases in access or effectiveness? With what additional costs?*

9. INFORMAL LEARNING

High-Priority Issues

9a. ***What informal education and training methods do workers use?***

9b. ***How much of adult learning is informal versus formal?*** *In what situations and for what types of knowledge/skill development is informal learning engaged in rather than formal learning?*

> 9b1. ***To what extent do workers use formal or informal methods to develop and update their skills and knowledge?***
>
> 9b2. ***What shifts are occurring over time in adults' participation in formal versus informal learning?*** *Are there greater shifts among some types of adult learning (e.g., basic skills) or for some groups rather than others (e.g., by SES or occupation)?*
>
> 9b3. ***What is the relationship between participation in formal and informal education?*** *That is, are formal and informal education complementary or mutually reinforcing—do those who engage in more one type engage in more or less of the other type?*

Medium-Priority Issues

9c. ***How accessible are*** *informal* ***education and training opportunities for workers, and to what extent are employees encouraged to use them? (e.g., libraries, Internet, manuals, lectures)***

9d. ***Is informal learning used as a substitute for formal learning among employers for whom formal learning is too costly?*** *In particular, do small employers and employers with high turnover rates substitute informal training for formal, or do they simply provide less training of any type for their employees?*

Low-Priority Issues

9e. ***To what extent do employers provide opportunities for informal versus formal work-related education based on their perceptions of skill demand?*** *That is, is formal training used more often for high-demand skills and workers, while informal training is used more often for low-demand skills and workers?*

9f. ***To what extent do workers rely on formal versus informal training for the development of specific types of work-skills?*** *(The specific types of work-skills to examine is a "conceptual/measurement" issue.)*

9g. ***How can effective*** *informal* ***education activities be developed and encouraged, particularly in areas of policy interest (e.g., work-related education, science and technology education)?*** *What role can technology play in such an effort?*

10. SERVICES AND ACCOMMODATIONS FOR ADULTS

High-Priority Issues

10a. ***To what extent are postsecondary institutions providing alternative offerings or delivery methods that meet the needs of adults?*** *To what extent are they working collaboratively with employers or vendors to provide contract or customized training, "just-in-time" training, and/or worksite-based training?*

10b. ***To what extent are postsecondary institutions and other providers offering competency-based assessment, portable credentials, or other outcome-based approaches that allow adults to document their skills and knowledge acquisition?***
10c. ***To what extent are postsecondary institutions and other providers offering support services or other special accommodations to improve access for adult learners, or to otherwise better serve adult learners?*** *(e.g., special counseling services for adults, transportation services, childcare, extended hours for student service offices, streamlined registration procedures, evening and weekend offerings)*

10d. ***What is the extent of noncredit coursetaking within postsecondary institutions?*** *Which institutions offer it and for what purposes (to generate revenues, for public service, to support economic development, etc.)?*

> 10d1. ***How many adults, and which adults, participate in noncredit coursetaking at postsecondary institutions, and for what purposes?*** *What trends are occurring in noncredit coursetaking?*

Medium-Priority Issues

10e. ***To what extent do support services or special accommodations for adult learners increase access to learning opportunities, particularly at postsecondary institutions?***

Low-Priority Issues

10f. ***What dissemination procedures do ABE, ASE, and ESL programs use?*** *How effective are these? How do participants learn of available programs?*

11. OUTCOMES AND EFFECTIVENESS

High-Priority Issues

11a. ***To what extent do adults use the skills and knowledge gained from an adult learning activity, either at work or in their personal lives?***

11b. ***To what extent do adults judge their learning activities to provide specific job-related benefits or returns, such as increases in earnings ability, better job satisfaction, improved ability to function at work, greater opportunity for job mobility?***

11c. ***To what extent do adults participate in learning activities that result in a credential, and what type of credential do they obtain (e.g., degree, state license, institutional certificate, company certificate)?***

11d. ***What are the economic returns to adults for participation in work-related activities?*** *What economic costs and benefits do adult accrue from their participation?*

> 11d1. ***What are the economic returns to education for adults at different education attainment levels?*** *What are the trends in these returns over time?*
>
> 11d2. ***What are the economic returns to employers for investing in employee training and education?***
>
> 11d3. ***Does the availability of employer-provided training make an employee more or less likely to remain with an employer?*** *To what extent does less opportunity for training encourage employee turnover, and to what extent does high turnover discourage the provision of formal training?*

Medium-Priority Issues

11e. ***What are the completion rates for adult learning activities (those that have a set end point)?*** *What personal, situational, and programmatic factors are related to completion rates?*

11f. ***How effective are various types of adult learning activities? (e.g., formal, informal, employer-provided)***

11g.***How do adults who have participated in technology-based education or training activities view the learning experience?*** *What strengths and weaknesses do they perceive each technology-based method to have?*

Low-Priority Issues

11h. ***What are the nonwork-related returns to adult learning activities?*** *To what extent do these activities increase or improve self-esteem, perceived functioning at home, in society, etc.?*

11i. ***Do corporate universities increase an individual's economic prospects among outside employers?***

11j. ***Why do ABE/adult literacy participants leave programs so early?*** *To what extent are they leaving because they have met their personal goals? Because the learning process is too slow or difficult? For other reasons?*

11k. ***What indicators do postsecondary institutions use to measure success in meeting their institutional goals?***

11l. ***How much college coursework, and what type, is necessary to ensure a return to education?***

11m. ***How do employers and postsecondary institutions that have used them view the effectiveness of technology-based delivery systems?***

11n. ***In terms of outcomes, what is lost or gained when a traditional course is offered via telecommunications?***

11o. ***What are adults' rates of completion of technology-based programs (those with set endpoints)?*** *Does distance education affect adults' course or degree completion rates?*

11p. ***How satisfied are employers, postsecondary institutions, and adults with the curricula of education offerings provided via new technologies?***

12. GOVERNMENT ROLE IN ADULT LEARNING

High-Priority Issues

12a. ***To what extent do adults use the Hope Scholarship and the Lifelong Learning tax credit?*** *Have these recent federal initiatives increased participation in adult learning?*

12b. ***How does government and corporate support for adult training and education (particularly for workers) in the U.S. compare to that in other countries?***

Medium-Priority Issues

12c. ***How are recent laws that decrease funding for prison education programs (e.g., 1998 Perkins and WIA) affecting state spending on prison literacy programs?*** *What are the trends in prison literacy program funding, overall and on a per-inmate basis? What are the trends in funding and participation for all adult correctional education programs?*

Low-Priority Issues

12d. ***What proportion of postsecondary institutions (overall and by type) explicitly target workforce preparation and/or economic development as an institutional goal?*** *What proportion explicitly target personal enrichment as an institutional goal? What trends are occurring in these emphases over time?*

12e. ***What federal, state, and institutional policies encourage or discourage enrollments of the" nontraditional" or adult learner?***

12f. ***What state policies encourage or support worker retraining efforts?***

12g. ***How many states offer training tax credits for employers?*** *How many employers use these tax credits?*

12h. ***How have recent changes in federal adult education and job-training legislation affected the demand for adult education services?*** *To what extent is recent legislation consistent with the goal of increasing access to lifelong learning opportunities?*

12i. ***Is new federal legislation that requires young adults receiving welfare to complete high school affecting participation in or completion of ABE/ASE programs?***

12j. ***To what extent are welfare clients provided with education or training opportunities, either as part of job-search services, or part of the job they obtain?*** *To what extent does the provision of education and training services vary by state?*

12k. ***Do new federal requirements (in WIA) to monitor client outcomes encourage creaming, thereby changing the nature of the clientele served by federally funded ABE/ASE programs****?*

12l. ***How is access to informal and a vocational education changing as a result of trends in public and private support?***

Appendix F:
Data Collection Overviews

This document summarizes federal data sources that provide data relevant to lifelong learning, as of Fall 1999.

National Household Education Survey,
Adult Education Component (NHES/Adult)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: Adults age 16 and above living in civilian households with a telephone. 12,500 adults surveyed in 1991; 19,700 in 1995.

Administration dates: Spring of 1991, 1995, and 1999 (currently in the field). Planned for every 2 years after 1999.

Relevant questions or issues: Participation rates in adult education activities (courses) in the previous 12 months, characteristics of participants (age and other demographics, highest level of education, occupation); main reasons for participation; the subject matter, duration, sponsorship, purpose and cost of courses; barriers to participation for non-participants. Adult education activities classified as: ABE, ESL, apprenticeship, credentialed, work-related, and personal development. The 2003 NHES/Adult will focus on work-related adult education.

Other notes: The NHES is a CATI survey. For reporting purposes, participation in adult education excludes those enrolled full-time in a credentialed postsecondary program, but includes those enrolled part-time in these programs.

Current Population Survey (CPS), October Education Supplement

Sponsoring Agency:	National Center for Education Statistics, with the Bureau of the Census
Sample/Population:	A nationally representative sample of 50,000 civilian households. Information is collected from each household member who is 15 years of age or older.
Administration dates:	The CPS is conducted monthly. Different supplemental questions are asked in various months to add information about the entire household, school enrollment, health, benefits, work schedules, and other topics. The Education Supplement has been conducted annually since the 1970s as part of the October CPS.
Relevant questions or issues:	Postsecondary attendance and provider of postsecondary education or training, by a range of demographic characteristics. Every three years, additional questions provide data on specialized topics, such as computer use, English proficiency, and disability status.
Other notes:	A March supplement to the CPS (the Annual Demographic Supplement) includes questions on income, work experience, and education attainment.

Survey of Income and Program Participation (SIPP)

Sponsoring Agency:	U.S. Bureau of the Census
Sample/Population:	Each panel of the SIPP utilizes a nationally representative sample of 14,000 to 36,700 civilian households. Each household member who is 15 years of age or older is individually interviewed.
Administration dates:	From 1984 to 1993, a SIPP panel was begun each February; each panel remained in the sample from 2–1/2 to 4 years. The SIPP was redesigned in 1996. The 1996 SIPP includes a sample of 36,700 households that will be interviewed from April 1996 to March 2000. The total sample is interviewed on a four-month cycle, or three times per year. Thus, the entire sample will be interviewed 12 times by March 2000.
Relevant questions or issues:	The SIPP is designed to collect information on the distribution of income and the use of and demand for federal support programs. Data relevant to lifelong learning include: Social and demographic characteristics, including education attainment; attendance at postsecondary schools; current labor force activity; types, sources, and amounts of income; and participation in social programs. Topical modules asked of subsamples include work histories, education and training, and other topics.
Other notes:	This is a difficult dataset to use, and as a result probably has been underutilized to date.

American Community Survey (ACS)
(under development)

Sponsoring Agency:	U.S. Bureau of the Census
Sample/Population:	A nationally representative sample of 3 million civilian households. Information is collected from each household member who is 15 years of age or older.
Administration dates:	Annually starting in 2003. The ACS is currently being field-tested.
Relevant questions or issues:	Educational attainment level of adults, current enrollment status, as well as extensive demographic information, including occupation and income.
Other notes:	The ACS will be administered by mail or (where necessary) by computer-assisted telephone interviews (CATI) or computer-assisted personal interviews (CAPI).

National Adult Literacy Survey (NALS)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: About 15,000 adults age 16 or older living in households, and 1,000 incarcerated adults.

Administration dates: 1992, planned for 2002.

Relevant questions or issues: Assessment of literacy skills of the American adult population. Three types of literacy assessed: prose, document, and quantitative literacy. Literacy levels can be examined by age, race/ethnicity, country of birth, educational and occupational background, and reading habits. Prison population can be examined separately.

Other notes: Survey administered using personal interviews conducted at respondents' homes. Proficiency scales were developed for each type of literacy, based on IRT scaling. State literacy estimates are available for 12 states.

The 2002 administration of this survey will be the National Assessment of Adult Literacy (NAAL). Item development for this survey is scheduled to begin in Fall 1999.

International Adult Literacy Survey (IALS)

Sponsoring Agency:	National Center for Education Statistics, in cooperation with Statistics Canada, representatives from OECD, European Union, and UNESCO.
Sample/Population:	Each participating country drew a sample representative of the civilian, noninstitutionalized population aged 16 to 65. In the U.S., the sampling frame for the Census Bureau's Current Population Survey was used to draw a sample of about 3,000 adults.
Administration dates:	Seven countries (including the U.S.) in 1994, an additional five countries in 1995, and an additional ten countries in 1998.
Relevant questions or issues:	Assessment of literacy skills of adults, using three scales to assess prose, document, and quantitative literacy. Literacy levels can be examined by demographic characteristics, educational attainment, labor force participation, occupation, parents' occupation, native language, and reading habits.
Other notes:	The IALS is administered using personal interviews conducted at respondents' homes. Proficiency scales (linked to the NALS) were developed for each type of literacy, based on IRT scaling. Future international adult literacy studies will use the International Life Skills Survey (ILSS), described separately.

International Life Skills Survey (ILSS)
(under development)

Sponsoring Agency: National Center for Education Statistics, with Statistics Canada

Sample/Population: Nationally representative samples of civilian, noninstitutionalized adults aged 16 to 65. Target sample size of 7,000 per country.

Administration dates: Planned for 2002 and every 5 years thereafter

Relevant questions or issues: Assessment of adults' "life skills" in six areas: prose literacy, document literacy, numeracy, problem-solving, teamwork, and computer literacy. Can be examined by demographic and economic characteristics of respondents.

Other notes: The ILSS is a revision and expansion of the NALS and IALS. Planned international participation of 10 countries. ILSS will be a household survey, administered via personal interviews. Proficiency scales are under development.

National Education Longitudinal Survey (NELS:88), Fourth Follow-up (under development)

Sponsoring Agency:	National Center for Education Statistics
Sample/Population:	Initial sample of 25,000 students who were in the 8th grade in 1988 (expected high school graduating class of '92). The fourth follow-up will survey approximately 15,000 former students (now about 24 years old). Hispanics and Asian-Americans were over-sampled in the base-year sample.
Administration dates:	Base-year in 1988; fourth follow-up in 2000 (previous follow-ups in 1990, 1992, and 1994). No additional follow-ups are planned.
Relevant questions or issues:	Current employment, postsecondary education, and other activities; job-related training; other adult education activities; income and expenses. Links to earlier waves provide information on transition from school to work at secondary and postsecondary levels, prior educational experiences, and demographic data. Comparisons can be made with previous NCES-sponsored high school cohorts from the National Longitudinal Study of 1972 (NLS–72) and High School and Beyond (HS&B, expected class of '82).
Other notes:	Includes high school transcripts and student assessments of reading, math, science and history/government in grades 8, 10, and 12. The NELS:88 is NCES' third longitudinal study of high school students, after NLS–72 and HS&B. All three surveys follow students for at least ten years after graduation.

1979 National Longitudinal Survey of Youth (NLSY79)

Sponsoring Agency: Bureau of Labor Statistics (U.S. Department of Labor)

Sample/Population: A sample of almost 13,000 young people aged 14 to 22 in 1979.

Administration dates: Annual data collections from 1979 to the present. Different topics or modules are included in each survey year.

Relevant questions or issues: The NLSY79 cohort is now in their thirties and forties. The survey has followed these adults through education and the workforce for two decades, collecting detailed employment histories, as well as data on education attainment, training investments, income, and other demographic and economic characteristics. Adult activities can be linked to early achievement/aptitude using high school transcript data that were collected in 1980–83, and results from the Armed Services Vocational Aptitude Battery (ASVAB), conducted in 1980.

Other notes: A second National Longitudinal Survey of Youth begun in 1997 (NLSY97) included a cohort of about 8,700 young people aged 12 to 16 in 1997. When the NLSY97 sample ages, it also will provide a wealth of data on the labor market behavior and educational experiences of adults; this later cohort can be compared to NLSY79 to examine how adults' participation in education and training changes over time.

National Postsecondary Study Aid Study (NPSAS)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: The NPSAS collects information on postsecondary students from the records of institutions of higher education, the students enrolled at these institutions, and students' parents. Institutions that are not eligible to participate in the federal financial aid program are excluded. In 1986–87, data on about 60,000 students were collected from institutional records at 1,100 institutions; about 43,000 of those students and 13,000 parents completed questionnaires. In 1989–90, data on about 69,000 students were collected from 1,130 institutions, with 51,400 students and 16,000 parents completing telephone interviews. In 1992–93, the NPSAS collected 77,000 student records from 1,000 institutions, with 52,000 student and 12,500 parent interviews. In 1995–96, 60,000 student records were collected from 830 institutions, and about 31,000 student telephone interviews were conducted.

Administration dates: 1986–87, 1989–90, 1992–93, 1995–96. Beginning with the 1999–00 NPSAS, administration will occur every four years.

Relevant questions or issues: Participation in for-credit postsecondary education courses, by age and other demographics, family income, education expenses, employment, parental demographic characteristics, parental support, how students meet college costs and education and employment aspirations. Includes data on high school graduation, previous postsecondary attendance, GPA, financial aid, part-time/full-time attendance, major, and reasons for choice of current institution.

Other notes: Among working students, the NPSAS distinguishes (based on self-report) between those who are "students who work" and "workers also in school."

Beginning Postsecondary Student Longitudinal Study (BPS)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: A sample of first-time postsecondary students selected from NPSAS samples. About 8,000 beginning students were sampled from the 1989–90 NPSAS and about 12,000 students were sampled from the 1995–96 NPSAS.

Administration dates: Base-year 1989–90, with 1992 and 1994 follow-ups; base-year 1995–96, with 1998 and 2001 follow-ups. Future BPS cohorts are planned for every eight years, alternating with B&B (described separately).

Relevant questions or issues: All issues that are on NPSAS; longitudinal tracking of students through postsecondary institutions and work, including employer-provided training and noncredit activities; can examine enrollment patterns and employment outcomes (within four years of initial enrollment). Cohorts of beginning students can be compared over time.

Other notes: Among working students, a distinction is made between "students who work" and "workers also in school."

Baccalaureate and Beyond Longitudinal Study (B&B)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: A sample of baccalaureate degree completers selected from NPSAS samples. About 11,000 students who completed their bachelor's degree in 1993 were sampled from the 1992–93 NPSAS. About 12,000 students will be sampled from the 1999–00 NPSAS.

Administration dates: Base-year 1992–93 with follow-ups in 1994, 1997, and 2002. Base-year 2000 with one follow-up in 2001. Future B&B cohorts are planned for every eight years, alternating with BPS (described separately).

Relevant questions or issues: All issues that are on NPSAS; longitudinal tracking of students through postsecondary institutions and work, including on-the-job training, continuing education, and other informal as well as formal education activities. Cohorts of bachelor's degree completers can be compared over time.

Other notes: The B&B was designed to provide reliable data on entry into and progress through graduate school, and on entry into teaching. Among working students, a distinction is made between "students who work" and "workers also in school."

Integrated Postsecondary Education Data System (IPEDS)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: Universe of all institutions whose primary mission is the provision of postsecondary education. This universe includes about 10,000 postsecondary institutions. The IPEDS universe *excludes* institutions that are not open to the general public (e.g., a prison or military training site).

Administration dates: Annually starting in 1986 (replaced the Higher Education General Information Survey, or HEGIS, system).

Relevant questions or issues: The IPEDS system consists of the following data collection components: institutional characteristics, fall enrollments (including age in odd-numbered years), fall enrollments in occupationally specific programs; student completions; graduation rate; finance; salaries of full-time instructional faculty; fall staff; and academic libraries.

Other notes: Institutions that are not eligible for Title IV funding complete only the institutional characteristics component of IPEDS. Prior to 1993, IPEDS *sampled* private, less-than-2-year institutions.

National Study of Postsecondary Faculty (NSOPF)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: A nationally representative sample of over 11,000 faculty in 1987–88; over 31,000 faculty in 1992–93; and over 29,000 faculty in 1999–2000.

Administration dates: 1987–88, 1992–93, 1999–2000, and every 5 years thereafter.

Relevant questions or issues: Number of total courses taught, noncredit courses, continuing education courses, adult and continuing education or basic skills courses; number of students enrolled in noncredit courses; number of (for-credit) courses taught via distance education, using computer or TV-based technologies or competency-based grading; faculty degrees in adult and continuing education or basic skills education; use of Web sites and e-mail for instructional purposes.

Other notes: The NSOPF system also includes an Institutional Survey and a Department Chairperson Survey (1987–88 only). Faculty at private, for-profit postsecondary institutions, nonaccredited institutions, and institutions that do not award 2-year or higher degrees are excluded from NSOPF.

Postsecondary Education Quick Information System (PEQIS)

Sponsoring Agency: National Center for Education Statistics

Sample/Population: The PEQIS allows sampling of postsecondary institutions or state higher education associations. For institution-level surveys, a sample of about 1,000 institutions is selected from a standing panel of about 1,500 two- and four-year postsecondary institutions. NCES' Integrated Postsecondary Education Data System (IPEDS) provides the sampling frame for the PEQIS institutional panel. A supplemental sample of less-than-two-year institutions can be selected from IPEDS if needed for a particular PEQIS survey. For state-level surveys, all 51 state higher education associations are surveyed.

Administration dates: As need arises.

Relevant questions or issues: As determined. Past surveys have focused on distance education programs, campus crime, remedial education, programs for disadvantaged precollege students, deaf and hard-of-hearing students, and financial aid.

Other notes: Provides a vehicle for addressing specific, focused questions that can be easily and quickly answered by state or institution respondents. Cannot survey students.

National Employer Survey (NES)

Sponsoring Agency: Office of Educational Research and Improvement (OERI), U.S. Department of Education

Sample/Population: Samples include business establishments that have at least 20 employees, excluding corporate headquarters, public sector employers, and not-for-profit institutions. 1994 and 1996 surveys included almost 3,000 establishments; 1997 survey included about 5,400 establishments.

Administration dates: 1994 with 1996 follow-up, 1997 with 1998 follow-up, planned for 2000. Administration after 2000 uncertain; will no longer be funded by OERI.

Relevant questions or issues: Incidence of employer-provided training, type of training offered (orientation, customer service, etc.), whether formal and informal training offered, number trained, training costs, training time, type of workers receiving training, whether current workers qualified, changes in skill requirements, use of new work organizations (TQM, benchmarking, etc.), hiring practices, use of outsourcing, downsizing, participation in work-based learning programs (mentoring, internships, etc.), other characteristics of establishment. Not all issues addressed in each administration.

Other notes: Data must be analyzed at Census Bureau sites. To date, only researchers at the Center for the Educational Quality of the Workforce (EQW, at UPenn) have analyzed these data. Although an employee component was originally planned, it has not been conducted due to funding constraints.

Survey of Employer-Provided Training: Employer Survey and Employee Survey

Sponsoring Agency: Bureau of Labor Statistics (BLS), for the Employment Training Administration of U.S. Department of Labor

Sample/Population: In 1993, a mail survey of a sample of 11,068 private establishments. In 1995, a CATI survey of a sample of 1,433 private establishments with 50 or more employees; in addition, two employees from each establishment were selected for interview and to keep a training log.

Administration dates: 1993, 1995. No future administrations are planned.

Relevant questions or issues: Amount of formal and informal training employers provide to employees, by establishment characteristics; costs and time devoted to formal training; incidence and intensity of training as reported by employees. Employee and employer characteristics are also collected, including workplace practices (e.g., TQM, job rotation, teamwork).

Other notes: This dataset is only available to researchers who work onsite at BLS.

Occupational Information Network (O*Net)

Sponsoring Agency: Employment and Training Administration, U.S. Department of Labor

Sample/Population: The O*NET is not a survey, but an occupational classification system that provides detailed information on over 1,100 separate occupations intended to represent the universe of occupations in the U.S. Occupations are defined based on task descriptions and grouped according to homogeneity. Information describing jobs is obtained from extensive job analysis procedures, including observation of workers, supplemented by data from employers and job incumbents. The job skills and conditions listed in the O*NET can be interpreted to describe the work requirements of the "average" worker in each occupation.

Administration dates: The O*NET was developed for use beginning in 1998. The classification system is continuously updated, with a proportion of occupations being re-analyzed on periodic basis. There is no current timetable set for the complete updating of O*NET 98.

Relevant questions or issues: Skills used on jobs, work knowledge, occupational preparation, work activities, work context, occupational interest and values, and work styles. The O*NET also provides information on job requirements including general and specific vocational preparation, continuing education requirements, licensure, and certification.

Other notes: The O*NET system replaces the Dictionary of Occupational Titles (DOT), which was used by DoL from 1960 to 1991. The O*NET refocuses and expands data on occupations to include information on worker characteristics, worker requirements, experience requirements, occupational requirements, and occupation specific requirements. It contains information about abilities, interests, work styles, basic skills, cross functional skills, knowledge, education, experience and training, licensing, generalized work activities, organizational context, work context, and specific occupational information. O*NET is designed to better describe the current occupational structure by taking a broader approach to measuring the dimensions and skill requirements of occupations.

Appendix G:
Conceptual and Measurement Issues

1. The Adult Population

How can we operationally define "lifelong learners" in existing and future data collections?

What are the policy-relevant groups of adults that should be included in examinations of lifelong learning? For example, adults by age, gender, race or socioeconomic status, labor market status (unemployed, employed full-time or part-time, temporary or contingent worker, not in labor force), time in labor force, occupation and/or industry sector, education attainment level, immigration/
language status. Or by social group—e.g., retirees, women returning to the labor force.

To what extent can participation in lifelong learning be explained through a life cycle or life events model? Should we use a "life cycle" approach to divide adults into age-specific groups that are more analytically useful? What age divisions make most sense?

2. Learning Attitudes and Skills

How can the level of basic skills in the adult population be assessed and benchmarked to provide an accurate gauge of the supply of skills?

How can we accurately assess the demand for ESL instruction? Are immigration rates an acceptable proxy for ESL demand? Can these rates be accurately projected for estimating future demand?

How can we assess trends over time in basic skill attainment when the basic-skills bar keeps getting higher, i.e., when what counts as "basic" keeps increasing? Is it more important to use a consistent definition of functional literacy in order to maintain a trend line, or to modify the level of literacy considered functional in order to reflect changing demands placed on adults by society and work? How can these conflicting needs be balanced?

What is the range of "basic" skills that should be considered—just adult literacy, adult basic skills including reading and numerical literacy, or a broader array of "life" skills? Which of these skills should be monitored over time? Can we set functional levels for these skills?

3. Adult Learning and the Labor Market

How can we assess skill demands (or the "skills gap") independently of employment cycles? Can the effects of fluctuations in employment rates (which determine the size of the reserve pool of workers) be removed from demand estimates?

Can we develop a useful categorization of "skills," one that will help policy analysts understand skill supply and demand, the focus of education and training programs, and trends in skill needs over time? (Some candidates: conceptual skills, substantive skills, interpersonal skills, self-management skills, operational skills, basic skills, technical skills, organizational skills, teamwork skills, literacy skills, problem-solving skills, communication skills, industry-specific skills, occupation-specific skills, company-specific skills, generic work skills, soft skills versus hard skills)

4. Participation Levels and Patterns

Can a meaningful typology or framework for lifelong/adult learning be developed to guide examination of this topic? What dimensions should be included in such a typology—e.g., work-related versus avocational, formal versus informal and/or nonformal, adult basic versus higher education.

How do we separate work-skill development or skills training from other types of education and training? Should we do so?

What avocational learning activities should be measured? To what extent should data collections focus on these types of learning activities?

How should the "intensity" of participation be measured? Should intensity be captured for all learning within the survey reference period only (e.g., the last 12 months) or for all activities engaged in during this period, no matter when they begin or end? Should intensity data be collected at all, or in a different manner, for educational programs (as opposed to courses)? Can such data be collected for informal activities?

5. Goals, Incentives, and Disincentives

How can we more accurately capture the many reasons adults typically have for participating in learning activities, while still classifying these learning activities as work-related or not? Should these be separate dimensions? What goals/reasons are important to assess, and how should this information be used? Is there a difference (or should there be a difference) between "reasons" for participation and "perceived benefits" of participation?

Can incentives and disincentives to learning be defined and categorized in a more useful way?

6. Investments in Adult Learning

Is there a better way to determine (or model) the costs of adult learning activities?

What participant costs should be included in examinations of individual costs to participation? For example, in addition to tuition and fees, should the costs of books and supplies be included? How about transportation costs, childcare costs, the "cost" of time spend in-class and in off-class study?

7. Adult Learning Providers

How can we collect information on the wide range of private education service vendors that is emerging?

Can we define and measure an adult's "choice set" for learning opportunities? How do adults determine what their range of providers is and which provider to use to fill a skill/knowledge gap?

Can we develop a useful typology of providers? Given the increase in collaborative relationships, how can and should we distinguish and divide providers?

What organization, among the mix that can be involved in offering an educational activity, should be considered the "provider"? Are there useful ways to distinguish among the different roles that various institutions may play in the development and offering of adult learning opportunities—such as distinguishing among financial providers, content-area providers, and site providers?

How can we measure the growth in and nature of partnerships between various providers of adult education and training—e.g., among curriculum experts (education institutions), delivery providers (technology companies), and/or the agency offering the instruction (employer or postsecondary institution)?

8. Instructional Delivery and New Technologies

Other than distance education, what technological delivery methods are important to monitor?

Should we, and if so, how can we assess the role of the Internet as a formal and/or informal learning tool?

9. Informal Learning

How can we better measure learning activities that are not formalized? How can we set reasonable, clearly defined boundaries around such activities?

What informal learning activities are (1) worth measuring and (2) capable of being validly and reliably measured?

10. Services and Accommodations for Adults

What are the services and accommodations that are most appropriate to adult learners, particularly to ensure that they have reasonable access to learning opportunities? What services and accommodations are important to assess from an equity standpoint?

11. Outcomes and Effectiveness

Can we determine the extent to which there is an "underinvestment" in worker education and training? By individuals, and by firms?

How can returns to training be evaluated in situations where the only expected return is to maintain the current job situation and benefits, rather than to improve that situation or increase those benefits?

Given the range of goals held by adult learners in postsecondary education, how can we measure the success of these students in meeting their goals? What meaningful indicators of success apply to students who are not seeking a degree or credential?

Are there better ways (other than degree completion) to assess the role and effectiveness of community colleges (or all colleges) in meeting the needs of adult workers?

12. Government Role in Adult Learning/Other

What data should only be collected nationally, and what data should be collected internationally?

Appendix H:
Summary of Lifelong Learning Team Meetings to Discuss Data Availability

1. The Adult Population

Data available to define adult learner. Our original definition of an adult (those who have had a break in continuous full-time participation in the formal education system) currently can be used only with the longitudinal studies (NLS–Y, NELS, SIPP) and the ILSS, which, as currently proposed, asks if the respondent has been continuously enrolled in education for the past ten years. If adults are defined based on age, we can define adults on every relevant survey. If we were to define adults as those who are post-compulsory, we would need highest education level, which should be available on all surveys, with the caveat noted below concerning measurement inconsistencies. If we want to exclude those participating in (for-credit) postsecondary programs, we need specific information on these enrollments, which are available in most surveys of adults. However, not all surveys distinguish between full-time and part-time postsecondary enrollments.

1a. What are the education attainment levels of the adult population? Trends over time?

We noted that many, if not all, surveys of adults ask for their highest education level, but it is unclear to what extent these data are collected in a consistent manner. The NHES is consistent with the CPS, but not all other surveys are consistent with these; for example, the NALS used a different response set. We noted that researchers have found that how this question is asked affects the responses one gets, so it is important to ask this question in the most valid manner, and to do so consistently.

1b. What is the sex, age, socio-economic status (SES) and racial/ethnic composition of the adult population? What are the education attainment levels of these sectors?

Race/ethnicity, age and sex seem to be asked in all relevant surveys. Race/ethnicity is added to the American versions of the IALS and ILSS background questionnaires, but is not typically included in other countries' questionnaires.

SES measures tend to not be standardized in ED surveys. Sean Creighton noted that sociologists define SES based on occupation, using occupation scales that provide an indicator of prestige (which incorporates education and income). Sometimes other measures are used, either (1) because data are collected from kids, who may not know their parents' occupations, and/or (2) to get measures that are broader indicators of "cultural capital" or "family resources and environment." These measures may include education level and income, as well as lists of items (such as books, encyclopedias, dishwashers, VCRs) in the home. We discussed whether it makes sense to collect individual or household SES for adults, and how these are defined. We also discussed the fact that, in the longitudinal surveys (NLS–Y, NELS, BSP, SIPP), SES can be calculated for an adult's childhood family and/or for the adult's current family.

Although we did not discuss this issue in detail, it might seem that family/household SES is the measure to use for determining a child's SES or an adult's SES background (the SES of the family in which the adult grew up). To determine an adult's current SES, however, we should do one of the following: use the *individual's* SES if the adult is financially independent; use the (current) *household* SES if the (young) adult is still financially dependent. Sean noted that, for methodological purposes, a father's (or head of household's) occupation suffices as a measure of household SES. Yet, we agreed that, for two-earner households, SES should be constructed based on both earners' occupations. (Although it was not discussed, I assume that the final SES measure would be the higher of the two.)

Under-represented groups: We also noted that some groups of adults that may be of interest for policy reasons are often either excluded from or insufficiently defined in adult surveys. These include military personnel, the incarcerated, displaced workers, and displaced homemakers. Adults with disabilities are included in some surveys (e.g., NPSAS, NALS), based on self-report. Spanish-speaking LEP individuals are included in the NHES/AE, NALS and IALS/ILSS. All of these groups often have unique education and training needs or opportunities, but may be hard to reach, or of such small number that it is difficult to collect reliable data on them. It is worth considering if and when these groups should be included in adult learning surveys. (We noted that the 1992 NALS had a separate prison sample.)

1c. What proportion of the adult population is learning disabled?

Disabilities are asked about in the CPS supplement (every four years), NPSAS, NALS, IALS and (planned in) ILSS. Disability data was also collected in the 1991 and 1999 NHES/AE surveys. All disability data are based on self-reports. It is, however, unclear how consistent these surveys are in question wording, which is likely to affect responses, and thus the rate of disabilities found in one survey versus another.

1d. How many and which adults use computers at home or work? Trends over time?

Few questions are asked about the use of computers outside of work. The CPS supplement (every two years) does include this information. Similarly, few questions are asked about the use of computers at work. The NES asks employers the percentage of employees who use computers, but data from workers are not available.

2. Learning Attitudes and Skills of Adults

2a. To what extent do adults recognize the need to be continuous learners?

—and—

2b. What are adults' perceptions of the value of lifelong learning for their own lives?

—and—

2c. To what extent do adults feel they have the skills and knowledge they need to function effectively at their current job and for future jobs?

Very little data are available to assess individuals' perceptions of skill needs and value. The IALS asked adults' their perceptions of the adequacy of their English and math skills for job opportunities and for daily life. The ILSS may ask a series of questions about adults' perceptions of the value of education and training in their own lives, but this item series has a low priority. The NHES/AE asks adults if they are interested in participating in learning activities, but this item does not directly address the questions above.

The 1996 NES asks employers how important it is for workers (in each of the following five categories: managers, supervisors, technical workers, clerical staff, and front-line or production workers) to continue their formal education; broadening this question to include other types of continuing education would provide a useful indicator of the demand for this type of learning, which could be compared to workers' views on the same issue (if those data were also collected).

2d. To what extent are adults, particularly workers, satisfied with existing opportunities to improve their skills?

Only one survey has data that address this issue directly. The NELS Fourth Follow-up asks respondents how satisfied they are with the "opportunity for further training and education (e.g., employer-provided training or employer-provided tuition)" at their current or most recent job.

Other surveys approach this issue indirectly by asking about courses that the adult would have liked to take but did not. The IALS asked if there were any courses that the respondent wanted to take but did not, and if not, was the reason that the course was not offered, or that the course was offered, but at an inconvenient time. The ILSS will ask a similar question, but the response options for why the course was not taken include the additional option of stating that the course was too costly. (The IALS had a response option of "financial reasons," implying that the course was too expensive.) The NHES asks if the respondent was interested in taking other courses, and if so whether s/he knew of any courses that could have been taken. When respondents answer "no" to the second question, it is unclear whether this indicates the unavailability of courses or a lack of searching activities.

2e. What types of skills and knowledge do adults, particularly workers, seek to acquire through adult learning?

Very limited data are available to distinguish the types of skills or knowledge adults seek to gain through participation in learning activities. Job-related vs. avocational skills is one widely used distinction. At the broadest level, this is a question about "spheres of influence" or "skill domains," that is, for what aspect or area of an adult's life the adult is seeking learning (see Table 2). For policy reasons, interest lies foremost in distinguishing between learning related to one's work-life, or to one's personal (non-work) life. A few surveys also distinguish between two important work domains, namely, learning sought in relation to one's current job or in relation to a future job. Many surveys make one or both of these distinctions, but often in combination with questions that ask about intended benefits, such as getting a degree or certificate or improving one's work skills. The nature of these survey questions and the confusion of skill "domains" with intended benefits are further discussed in the subsequent section on "Goals and Reasons for Participation."

Questions about the specific types of skills sought are below the level of skill domains. Very limited data are available at this level. A few surveys distinguish basic skills education from other types of learning. The NHES/AE distinguishes between ESL and ABE/GED education, and the NALS distinguishes among the three types of basic skills education (ESL, ABE, GED). The IALS asks if courses were taken to obtain an elementary or secondary school diploma (an expected benefit which can be inferred to involve participation in basic education). Beyond these distinctions, information on the types of knowledge and skills sought do not exist. Employer surveys are the exception—these surveys collect very detailed information about the skills involved in work-related offerings, typically including categories such as management training, technical training, clerical training, sales or customer service training, orientation training, health or safety training, basic skills instruction, etc. The types of skills *sought* by learners in general or by workers is not collected anywhere, however.

Before better data on specific types of skills and knowledge can be collected, however, analysts must clearly specify what types of skills and knowledge are important to distinguish. We believe that policy concerns dictate that work-related, avocational, and basic (or remedial) skills/knowledge be clearly distinguished. Other skill areas that are of most interest include computer skills and communication skills; no surveys collect information on these skills. Beyond that, further distinctions can be made, depending on the value of those distinctions compared to other questions that need to be asked about the nature of coursetaking (see our list of "conceptual and measurement issues").

2e1. ***How generic or transferable is the training that workers receive?***

This information is collected only on the NLS–Y, with reference to on-the-job training. Workers are asked if the training they received can be used to do different work for the same employer or to do the same work with a different employer. Specifically, they are asked to quantify the proportion of the skills they learned on the job that would be useful in different work or with a different employer (all or almost all of the skills; more than half of the skills; about half the skills; less than half the skills; or none or almost none of the skills). See the discussion of Q7 under "Adult Learning and Skills in Society," in the summary of the June 15th meeting.

2f. ***What is the level of basic skills in the adult population?***

The national and international adult literacy surveys (NALS/NAAL, IALS/ILSS) assess adults' literacy skill levels. According to current plans, these data should be available nationally every 5 years and internationally every 10 years. The NALS and IALS data have been criticized for setting too high a benchmark for determining an "adequate" literacy level. It is beyond this task force's mandate to evaluate this issue, although a resolution should be possible if we employ methods similar to those used to validate job placement and screening tests.

The NLS–Y includes a series of vocational aptitude tests, which also provide an indicator of adult skill levels. Finally, broad indicators of basic skill levels are available from NHES/AE and other surveys, which ask adults their level of education and the language that they speak at home.

3. Labor Market Demand for Adult Learning

3a. **What skills are used in the labor market, and to what extent is the learning of new skills or knowledge characteristic of jobs in the labor market?**

—and—

3a1. **To what extent are occupations characterized by continuous skill development?**

—and—

3a2. **What is the job-composition of the labor market, by skill, learning, or education attainment requirements?**

—and—

3a3. **What types of skills and learning are increasing and decreasing in demand?**

Sean discussed a recent report (Perie et al. 1999)[1] that uses IALS data to examine the supply of and demand for literacy skills. The report defines skill demand using IALS questions that ask respondents what skills they use on their jobs. The supply of skills is defined using the IALS assessment. We could propose a similar approach in NCES data collections. Job skills (grossly defined) are collected in the NALS and are proposed for ILSS. The ILSS, however, includes assessments of a broad array of adult skills that may or may not all have corresponding questions in the job-skills section (e.g., problem-solving, computer literacy). The job-skills section of the ILSS background questionnaire should include the full range of skills that are assessed; this would permit linking the "supply" of all ILSS skills with the "demand" for those skills (as inferred from use on the job).

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[1] Perie, M., Gruner, A., Williams, T. and Kastberge, D. *Literacy in the Labor Force: Examining the Supply and Demand for Literacy in Twelve Nations.* Paper presented at the American Education Research Association annual meeting, Montreal, Canada, 1999.

To assess skill demand more broadly, we discussed the value of expanding survey questions about skills used at work to include a broader range of skills (e.g., the SCANS skills). The problem with such an approach is that it can get rather long and tedious. An alternative data collection method, "behavioral event interviewing," was discussed; this method asks respondents to describe how they deal with a problem at work, and their verbatim transcripts are coded to provide lists of skills used.

We also discussed other indicators of skill demand that are easier to collect, such as whether the respondent is taking any courses in response to continuing education requirements, employer requirements, or other job-related requirements. This approach is already used to some extent on the NHES/AE. The NELS fourth follow-up and BPS/B&B also have a relevant question on requirements. Yet, none of these surveys does a thorough job of linking requirements to specific courses, which is necessary to determine what types of skills/learning is in demand.

To collect trend data on the use of skills, we can probably rely on the NALS/NAAL and IALS/ILSS. We could also use sources of information on the content of jobs. Job analysis has a long tradition at the Department of Labor, beginning with the Dictionary of Occupational Titles (DOT), which provided measures of the skill content of jobs. The DOT was constructed through job observation, supplemented by interviews with workers and supervisors. The DOT has recently been replaced by the O*NET, which continues to define jobs through task analysis, using measures that better reflect the current job structure and job skills. The O*NET, like the DOT, provides extensive data on job skills, based on the work requirements of the "average" worker in each of about 500 separate occupations. O*NET skills are updated continuously, although only a small proportion of the total list of occupations is updated at any one time. Included in the O*NET system are measures of cross-functional skills, work knowledge, occupational preparation, work activities, work context, organizational context, occupational interest and values, and work styles. The O*NET is sufficiently different from the DOT, however, in that it is not possible to construct trends that link historical data with current or future O*NET data.

Finally, as mentioned above, the NES asks employers how important it is for workers to continue their formal education. If this question were asked about the need for continuing education more broadly, it could serve as a useful indicator of the demand for lifelong learning among the workforce. This question should be asked for workers in categories defined as narrowly as possible, and the categories used in this employer question should correspond to occupation data on employees from surveys of adults (so that findings on learning "demand" can be linked to employee attitudes, skills, and coursetaking behavior).

3a4. To what extent do workers report that the skills, knowledge, and learning requirements for particular occupations are changing? To what do workers attribute these changes?

Changes in skill demand over time are typically measured using direct indicators of occupation skill levels (such as O*NET data) and indirect indicators of skills (such as earnings and education), then examining changes in the distribution of occupations (by skill level) in the economy. If occupations with higher skill levels become more prevalent, then we can infer that skill demands have increased.[1]

Asking workers *directly* about skill and learning requirements is not an approach that has been consistently pursued by DoL. As a result, data on workers' perceptions of skill and learning demands are scarce. None of the adult surveys that we reviewed asked workers about changes in skill/knowledge demands that they faced on the job. One potential problem with data from workers (as opposed to job-analysis data) is that workers' learning demands may fluctuate with changes in the unemployment rate—as unemployment goes down, more low-skilled workers enter the workforce, increasing the need for learning or skill development. There are ways to correct (analytically) for this labor market influence, however. There also are reasons to examine changes in skill needs in the context of labor market changes, for example, to describe current conditions within the existing labor market.

On the other hand, the need for *continuous or periodic* learning on the job should be independent of labor market cycles. No survey asks adults about the need for continuous or periodic learning of new skills/knowledge. The O*NET provides some relevant information on this issue, as it defines occupations based on the amount of training the "typical" worker has had over a two-year period.

Changes in skill and learning needs can also be indirectly inferred from changes in education levels and/or participation rates in work-related learning (using NHES, SIPP, etc.). To do so effectively, however, one would need information on both formal and informal work-related learning, which is not currently available (see discussion in "Types of Skills and Knowledge" section).

3b. ***To what extent are the skills and knowledge required of workers specific to an employer or industry, or generic in nature?***

We decided the best way to collect data on this issue is to ask adults if the skills they use on their job are firm/job-specific or transferable. Yet, we noted that many skills involve both generic and specific skills—e.g., selling a company's product (selling=generic; product knowledge=specific), writing a company-specific proposal (technical writing=generic; company format=specific). So it might be best to not categorize skills/knowledge as one or the other, but to allow for both—e.g., asking "to what extent do or can you use the skills you learned in this course on your job" and "to what extent could you use those skills at a similar job with another company?"

Only one survey, the NLS–Y, asks workers about the generalizability of their skills, and it does so as recommended above. The NLS–Y asks respondents if the skills they have learned through training could be used at the same job with a different employer, at a different job with the same employer, or at a different job with a different employer.

We also discussed the *theoretical* assumption that learning paid for by employers should be firm-specific, and learning not supported by employers should be more generic. A survey that asked adults whether the skills they learned in a given activity are transferable as well as whether the employer supported the activity would allow us to test this assumption. Again, the NLS–Y is the only survey that provides the requisite data to address this issue.

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[1] For an example of this approach, see Howell, D.R. and Wolff, E.N. (1991). Trends in the Growth and Distribution of Skills in the U.S. Workplace, 1960–1985. *Industrial and Labor Relations Review, 44*, 486–502.

3c. ***To what extent do workers rely on (use) skills or knowledge acquired through formal education rather than skills/knowledge acquired at the workplace?***

No survey asks workers about the extent to which the skills they use on the job were acquired through the formal education system or through other means (such as on-the-job training). This is probably a difficult question for most workers to answer. The SEPT and the 1997 NES, however, provide an indirect approach to approaching this issue. The SEPT asked workers how long it took before they were comfortable performing their job duties. The 1997 NES asked employers how many months it takes a typical newly hired worker (in each of five categories) to become fully proficient in his/her job. These measures can serve as indicators of the extent to which workers rely on on-the-job-training, rather than formal education, for *initial* job skills. The SEPT also asks about a related issue; this survey asks workers how they learned the skills required by their current jobs—through formal training, informal training, or on their own—and which method was most important.

Finally, the extent to which workers need or seek additional training—both formal and informal—can serve as an indicator of the extent to which formal education does not provide all of the job-skills a worker needs throughout his or her worklife. Only the SEPT, which is no longer administered, collects information on workers' formal *and* informal learning experiences (over a two-week period).

4. Participation Levels and Patterns

4a. **How many and what proportion of adults participate in lifelong learning activities?**
—and—
4c. **Which adults participate in lifelong learning activities and which do not?**
—and—
4c1. **Who participates in each type of lifelong learning activity (formal, informal, work-related, avocational)?**
—and—
4f. **What are the characteristics of ABE/ASE/ESL-eligible adults who are and are not interested in participating in these programs?**

Basic data on participation levels and the characteristics of participants in adult learning are available from a range of data sources including NHES, NALS, IALS/ILSS, CPS, ACS, NLS–Y, SIPP, NELS, and NPSAS and its spin-offs. None of these surveys, however, collects information on the full range of formal and informal learning activities that encompass adult learning. Most surveys only focus on formal activities, and others on only work-related or employer-sponsored training activities. No survey provides data on participation in informal avocational learning activities.

Table 1 (below) summarizes the adult learning activities included in various surveys. The CPS, ACS, and NPSAS surveys are restricted to formal postsecondary coursetaking. The NALS asks only about formal education and adult basic education courses. The BPS/B&B asks about formal postsecondary education and formal work-related education, but not about formal avocational activities. THE SIPP asks about education programs and work-related learning activities (with no distinction between formal and informal activities). The NHES, IALS, and NELS ask about a wide range of formal education activities, but not about informal activities. The NLS–Y asks about education programs and formal and informal work-related activities, but not about activities taken for reasons other than work. Data on specific types of adult basic education, such as ESL and GED programs, are infrequently available; the NHES and NALS are the best sources for these data. The ILSS is the only survey that, if developed as planned, will include a full range of formal learning activities in addition to work-related informal activities, but not informal avocational activities, and with no data to distinguish basic skills education beyond that taken to receive a high school diploma. Note that in all of these surveys it is an open question whether participation in a postsecondary program should be counted as job-related.

Not surprisingly, definitions of informal (work-related) education vary. The NLS–Y asks about informal on-the-job training provided by supervisors and co-workers, and about self-paced informal training (using manuals, computer programs, or other sources of information.) The current proposal for ILSS includes questions asking about (1) participation in trade fairs, professional conferences, short lectures or half-day seminars, quality or shop circles, or instruction at the workplace by non-instructors; and (2) various types of self-initiated learning for work. The NES, which asks about informal employer offerings, defines these as "situations in which employees learn by observing others doing a job or are shown how to do a job in an informal one-on-one situation."

We discussed the possibility of constructing a scale to assess involvement in informal learning (including avocational learning) by asking about items such as the number of books read, use of the Internet, etc. Since virtually all adults are likely to engage in some type of informal learning, the scale/item should be constructed to get at the different *levels* and *diversity* of such participation—as well as identifying the most common sources of informal learning.

To determine participation rates among those *who are eligible* for basic skills education or ESL (rather than participation rates among all adults), we need to first define the "eligible" populations. This is not an easy task. It has been done to some extent in NHES (i.e., those eligible for ESL are those who do not speak English at home, and those eligible for basic skills education are those who have not completed high school). The adult skills assessments provide another means to identify eligible populations; however, basing these definitions on assessment scores raises questions about the assessment benchmarks (see discussion above). It would help to have better information on the specific literacy levels required by various types of jobs, so that the literacy levels determined from the assessments could be linked to job requirements. This type of validity study would be costly, but would make the results of the literacy assessments more interpretable and useful.

4b. *How much time do adults devote to each lifelong learning activity? (How "intensive" is learning, what is the total "volume" of coursetaking?)*

Data on the amount of time spent in specific learning activities (hours of instruction) are available in the NHES, SEPT (employer-provided training only), IALS, and ILSS. It is commonly believed, however, that self-report data (currently used in all sources except SEPT) are somewhat unreliable; for example, in the NHES/AE, many reported course durations are too long to be believable. Thus, there is a data quality issue with most existing time measures. A time-use study, like that used in SEPT (employee logs), is the most effective way to collect valid data on time spent in learning activities; asking about activities over a shorter time-frame (e.g., three months instead of one year) may help as well. Both of these solutions, however, must make allowance for the "seasonal" nature of learning—for example, by collecting data in short "waves" over an entire year.

Another approach to minimizing the reliability problem would be to use categorical data, as is done on the SIPP. In this survey, respondents are asked to indicate the time spent in each training course using categories based on the following categories: less than a day; a day; a week; a month; more than a month. These data are less precise than the hourly data collected in other surveys, but do provide reasonable categories that can be useful for descriptive purposes and that are likely to be fairly reliable.

Another issue that needs to be resolved is whether the time measure should include the "volume" of activities only during the reference period (i.e., the time spent in learning during the 12-month period of the NHES), or the total "volume" of all activities that were taken during the reference period, even if some of the activity occurred before the reference period began. Similarly, what if the activity has not yet been completed? There may be reasons to know one or both of these "volume" measures. For example, if one wants an indicator of the investment in human capital occurring through adult learning activities, the volume of training received over a set reference period is the better measure. On the other hand, if one wants an indicator of the amount of skill acquisition by individuals, the total volume of an individual's learning activities is a better measure. If one wants to calculate opportunity costs for participation in learning activities, total volume is also preferable.

At the current time, all surveys that collect volume information do so for a set reference period. The NHES asks about activities during a 12-month reference period, and the ILSS proposes to do the same. As mentioned above, the SEPT uses employee logs to get the volume of activity during a set period of time (two weeks).

Finally, there is the issue of long-term educational programs: Should volume data be collected for programs as well as for courses, and if it is collected for programs, do we want to know the duration of the entire program or for just the courses currently being taken as part of the program? The 1995 NHES asked about the number of months and hours per week spent in courses for a credential program, but this question applied to only the past 12 months.

4d. **What are the trends in participation for adult learning?**
—and—
4d1. **What are the trends in participation by adults in particular age-cohorts and education attainment levels?**
—and—
4d2. **What are the trends in participation for each type of learning?**

Trend data in lifelong learning is limited by the newness of this topic as an area of study. Data on most issues (other than education level) do not go back very far because the surveys have not existed for a very long time. Also, since this is a relatively new area of study, the specific questions asked tend to change as refinements are made to earlier instruments (e.g., the IALS/ILSS and various versions of NHES/AE). These limitations will obviously disappear over time.

Data on participation over time are best collected from NHES and CPS. The SIPP can also provide trend data separately for regular education and training. The NPSAS and its spin-offs provide trend data on the adult postsecondary population. Other surveys are administered too infrequently to be very useful and/or are too inconsistent in how they address this issue to provide meaningful trend data.

For assessing trends in different types of learning, the NHES is the only viable source of information. This survey provides trend data on work-related vs. avocational learning, and for certain types of learning (ABE, postsecondary, etc.); it does *not* provide information on informal learning.

4e. ***How extensive are enrollments of part-time and adult students at postsecondary institutions?***

Participation in postsecondary education is available from a number of sources, including IPEDS, the NSPAS and its spin-offs, SIPP, and the CPS and ACS. These data, however, are limited to postsecondary degree or for-credit coursetaking. It would be useful to distinguish between for-credit and noncredit postsecondary coursetaking. We considered comparing counts from CPS to NPSAS to get counts of those participating in noncredit coursetaking, but this would confound differences in noncredit participation with differences in providers, since the CPS includes institutions that are not included in the NPSAS. One might be able to infer levels of participation in noncredit postsecondary coursetaking from responses to some of the NHES items, but the items as currently structured are not well suited for this and so might yield misleading results.

Another issue is who "counts" as an adult postsecondary student. If one wants to define adults based on age, all the data sources listed above will suffice. Yet, if one wants to define adult students based on part-time attendance or delayed entry, participation data are restricted to the NPSAS/BPS/B&B and NLS–Y.

Table 1—Types of adult learning activities included in surveys

	Formal education program	Formal work-related	Formal avocational	Informal work-related	Informal avocational	Basic skills	Specific types of work prgms	Apprenticeship	Course titles
CPS	X								
ACS	X								
NPSAS	X								
NALS	X current					X ABE, GED, ESL			
SIPP*	X	X							
BPS/B&B	X	X							
NHES	X	X	X			X ABE/ GED, ESL	1991 survey	X	X
IALS	X	X	X			X ASE		X	X
NELS	X past, current	X 6-mo.	X 1year			X past		X current	
NLS–Y	X	X		X		Vocational aptitude	X	X	
ILSS	X	X	X	X					X
NSOPF	X offerings								
NES		X offerings		X offerings			X offerings		
SEPT		X offerings					X offerings		
IPEDS	X offerings								

*The SIPP does not distinguish between formal and informal work-related learning activities. Most reported activities are likely to be formal instructional activities, but some informal activities may be included as well.

5. Goals, Incentives, and Disincentives

5a. ***What are adults' goals or reasons for participating in adult learning activities?***
—and—
5a2. ***What are adults' reasons for engaging in work-related learning?***

It is difficult to determine the reasons why people do (or do not) participate in adult learning, because they will often rationalize their decisions, or give a socially desirable response. Because of this problem, we do not propose that individuals be explicitly asked why they decided to participate, except in the context of asking about what benefits they hope to attain, or what external factors induced them to participate (such as a work or professional requirement, or an employer's "suggestion").

In other words, adults' "reasons" for participation in learning activities can be summarized in the form of intended benefits (e.g., "I hope to get a promotion"). These intended benefits can also be considered an "incentive" to participate (see Table 2). Further, the types of skills adults seek, particularly the broad typology of work-skills and personal-skills can also be viewed as broad goal-domains (as opposed to skill domains, as discussed above). It is not always easy to separate these different aspects of reasons or incentives for participation, and existing surveys vary in the extent to which and ways in which they make these distinctions. It also was not easy for us to keep these issues clearly separated. Thus, some aspects of "goals and reasons" for participation are also discussed in the section on "Incentives and Disincentives."

Based on previous conceptual work by others, at least three work-related goals should be assessed: initial skill development (the acquisition of skills that enable job entry, which can include only initial job training or re-training as well); skill updating, to provide additional skills for one's current job; and career skill-building, or skill acquisition for job advancement/promotion. As discussed below, the NHES asks about two of these goals (training for new or current job), and the NELS and NLS–Y target all three (The NELS does not explicitly separate initial job training from retraining, but retraining can be inferred if the respondent already has a job and is seeking skills for a new job).

Five surveys—NHES, IALS, NELS, SIPP, and NLS–Y—ask explicitly about goals and/or reasons for coursetaking. Each survey, however, approaches this issue somewhat differently. The NHES is the most complicated. This survey divides learning activities into "types," which partially correspond to the "skill domains" discussed above; one section of the survey is devoted to work-related learning activities, another to "other activities" (other than work-related, apprenticeship, basic skills and postsecondary degree programs, and commonly referred to as "personal development" activities). Within each of these sections, the NHES asks respondents their main reason for participating; these reasons vary somewhat depending on the type of education being asked about but in general, were coded into the following six reasons: improve on current job; train for new job; improve basic skills; get a credential; personal, family or social reasons; other. (Note the mix of intended benefits and skill-domains.) NHES staff have noted that respondents often have trouble choosing (stating) one main reason—as one might expect, respondents often have many *reasons* to participate in a learning activity. NHES staff have also noted that the "reason" for participation does not always match the "type" of activity. The disjuncture between "reasons" for participation and "types" of participation (what we would call skill domains) suggests that the NHES format needs improvement.

The IALS used a simpler approach, asking respondents about broad skill types, or skill domains; the survey asks if each course was taken for job/career reasons, personal interest, or other reasons, but does not ask about intended benefits. The proposal for ILSS is to drop "other," leaving only job/career reasons or personal interest, but to add a question that combines some intended benefits with more specific job-domains (skill upgrading for current job; skill upgrading to change jobs, get promotion, or start new business; retraining for different job, for first or new job or to reenter labor market; other).

The NELS is more similar to NHES; it divides learning activities into work-related training and other training (broad skill domains), then asks about more specific goals within each section. For work-related training, the listed goals are as follows: current job, promotion, new or different job; for "other" training, the goals are as follows: career, personal interest, acquisition of basic skills. If NELS respondents have obtained a GED, they are asked if they did so in order to do better work, to enter postsecondary education, because it was required by job or employer, or for personal reasons. Note that each set of NELS goals also mixes intended benefits and skill domains.

In SIPP, respondents are asked about participation in "regular education" and in "training." Participants are not asked about their reasons for participating in "regular education." Those who participated in training are asked whether their goal was to improve their job skills or to qualify for a new job. If the training is to improve job skills, the respondent is asked whether the training was intended to teach basic job skills (such as office automation software, effective work habits, or quality management); teach new skills to use equipment, machinery, or technical procedures; upgrade skills on a topic already known; introduce organizational policies, guidelines, or requirements; prepare for another assignment in the organization; or prepare for another job outside the organization. If the purpose of the training is to obtain a new job, the respondent is asked whether the training was intended to learn job-seeking skills or job-specific skills. These options mix goal domains and intended benefits, but in a way that is somewhat logical.

Finally, the NLS–Y, like the SIPP, only asks about reasons for participating in training, with these goals as options: new job search; job induction; licensing or certification; new work methods or processes, skill upgrading, or promotion or job advancement. Again, domains (i.e., new or future job) are mixed with intended benefits, but since respondents can choose more than one alternative, the problem is not as critical in this survey.

Team members noted that one intended benefit that is typically missing is something like "self improvement or betterment." The "personal reasons" category on NHES and the "personal interest" category on NELS may capture this now, but only for those who are not taking a course primarily for a job-related reason. Learners could, however, take courses both to improve on their jobs and to improve themselves generally, but we cannot tell that this is happening based on current data collection strategies. More clearly separating skill domains from intended benefits should make it easier to capture this benefit (as well as others).

In short, no survey does a good job of asking about spheres of influence and intended benefits for both work-related and personal-interest courses. In general, this confusion is one aspect of a larger inability to model the process of decision-making that leads adults to either participate or not participate in learning activities.

5a1. *What are adults'* educational *goals when they participate in adult learning?*

To find out about adults' education goals in general, team members noted that three questions need to be asked: (1) for those taking any course—are you working toward a credential/degree, and if so which one; (2) what is the highest level of education you would like to achieve; and (3) what is the highest level of education you realistically expect to attain? These three questions are currently asked (only) on NCES' postsecondary surveys. The NELS fourth follow-up, however, does ask respondents the highest degree they expect to have by age 30, and the NLS–Y asked in 1979 what education goal respondents planned to achieve in the next twenty years.) It would seem that the "highest level of education" questions make sense for the "traditional" college undergraduate, but may be less useful for adults in general. They might, however, be useful to ask of sub-groups of adults, such as younger adults (as in the NELS and NLS–Y) or adults who have no college degrees.

The more relevant question (for our purposes) of what educational goal accompanies specific adult coursetaking is asked on the NHES, IALS/ILSS, SIPP, and, to some extent, on the NELS fourth follow-up.

On the NHES, participants in a postsecondary education program are asked what level of degree they are seeking (and in what major field of study). Those taking courses that are not part of an education program are asked their main reason for taking the course, and one coded option is "to meet a requirement for a diploma, degree, or certificate of completion." There are a few problems with this data collection methodology. First, since respondents can give only one main reason, those who intend to earn a degree but see their main goal as something else, such as acquiring job skills, may not indicate that they have an educational goal. Yet, with the exception of those in adult basic education programs, it is unclear what it means for someone to be meeting an education degree or certificate requirement when s/he is not in a postsecondary program. Thus, based on the NHES, it is impossible to tell what proportion of adults are taking postsecondary courses with the intention of getting some kind of educational credential, and what proportion are not; the inference (possibly a good one, but we do not know) is that all credential-seekers are enrolled in "programs" rather than taking individual courses. (Noncredit coursetaking at a postsecondary institution is also difficult to discern using this NHES format.)

The IALS asks whether a course was taken for one of the following: a university or college degree/diploma/certificate; a trade or vocational diploma/certificate; an apprenticeship certificate; an elementary or secondary school diploma; or career upgrading (only one can be selected). The specific categories to be used in ILSS have not yet been determined. The SIPP asks whether the purpose of enrollment in a formal education program is to obtain one of seven types of degrees or certificates.

The NELS fourth follow-up does not ask about education goals for those currently enrolled. That is, for job-related and other adult education courses taken in the last X months, there are no questions about education goals associated with those courses. The NELS, however, does ask respondents what professional licenses or certificates they have obtained since leaving high school, if they obtained a GED (for those who did not graduate from high school), and what postsecondary degrees they have obtained (AA, BA, etc.). If they attended a postsecondary institution without getting a degree, they are asked why they did not get the degree, and "done taking the desired classes" is one response alternative. Thus, the NELS allows one to look retrospectively at the education goals accompanying postsecondary enrollments. Note, however, that for someone who took a noncredit, continuing education, or other course not taken toward a degree, responding to the question of whether s/he has "attended a postsecondary institution" may be somewhat awkward—this question seems to imply enrollment in a degree program. The NPSAS follow-ups ask similar questions to those asked in the NELS.

In addition, the CPS distinguishes between enrollments in a "regular school" program and in a vocational, trade, or technical school.

In most surveys, noneducation credentials (i.e., professional/trade certificates such as real estate license, Novell technician certificate) are not well defined or distinguished from education credentials. One cannot always tell from survey responses if the certificate being sought is postsecondary or professional/trade. (Also, a course can lead to both, such as a nursing course that counts toward a bachelor's in nursing degree *and* helps prepare the learner for a state-licensing exam.) The SIPP does separate education and professional credentials, but it is not clear that this survey includes the full range of professional/trade credentials.

5b. ***What are the incentives and disincentives (barriers, constraints) to participation that influence adults?***

We reviewed an earlier team discussion (from May 11 meeting) where we had proposed asking about the decision making process that adults go through when they consider participating in an adult learning activity. Team members had mixed views on this approach, with one team member being concerned about the difficulty of measuring individuals' motivations. In general, however, there was a consensus that we need to find better ways to understand the factors that influence participation and access.

Most incentives fall under the category of "intended or expected benefits," as discussed above. For example, the "expected benefit" of a promotion can be one incentive for participation in learning, as can the benefit of performing one's job better, or becoming eligible for more interesting or challenging work assignments. The availability of this type of incentive information was reviewed above (questions 1 and 2).

We discussed the difference between the terms "incentives" and "inducements," and decided that the latter term better captures the full range of factors that can affect an adult, including requirements and other external incentives (such as an employer's "encouraging" an employee to participate). Recent (as yet unpublished) analyses of the NHES by one team member suggest that requirements motivate much of adult's work-related coursetaking. In fact, the most important factor contributing to differences in participation rates may not be barriers to participation, but external inducements to participation. Yet, the current focus in existing surveys is on barriers; no survey does a very good job of addressing the issue of inducements, although this issue is partially addressed in a few surveys. The NLS–Y asks if a course was taken in response to an employer requirement, as does the NHES. The NHES also asks a general question about whether the respondent has continuing education requirements (but does not ask if a specific course was taken in response to such a requirement). The NELS fourth follow-up asks those participating in work-related education if their training was required by or encouraged by their employer, but this question is not linked to an individual course.

The SEPT asks (in the employee survey) about potential outcomes from participation in learning that could be reframed as incentives. These include the following: promotion; higher pay/bonus; certificate/credential; mandatory; learn valuable skills; stay current in skills. The NELS fourth follow-up also asks a question about outcomes that could be reframed as incentives. The response options for this question are the following: provided you with opportunities for jobs that you could not have otherwise gotten; allowed you to earn a higher salary; enabled you to take on more responsibility on the job; resulted in more opportunities for promotion; and improved your performance on your current job.

Other questions could be asked concerning respondents' perceptions of employer inducements, on the grounds that such perceptions are likely to motivate behavior. One could, for example, ask "does your employer care whether you participate in education or training related to your job?" Other questions could focus on the extent to which learning is built into a job: "Is a discussion of training opportunities included in your annual job evaluation?" "Does your company provide training or provide tuition reimbursements for employees *in your job*?" In short, we have yet to move beyond the simple "those who have more get more" explanation of adult learning patterns. We should demonstrate the role of inducements and other incentives, particularly employer and professional requirements, in contributing to this pattern (at least for job-related learning). For example, some jobs have built-in career ladders or pay-scales that can be climbed by furthering one's education and training (e.g., teaching), while other jobs (e.g., custodial work) do not; those in the former category have a greater incentive to participate in adult learning than those in the latter. (Some of these "inducements" are aspects of employer support, which is discussed in more detail in the section below on "Investments in Adult Learning.")

Questions about barriers or constraints to participation are asked in NHES, IALS and (most likely) ILSS. The NHES questions have not been very satisfactory, and are currently being reevaluated. In general, these questions find that time and money are common barriers, but the impression is (based on retests) that these responses are not very reliable—individuals seem to make up reasons for their lack of interest or action. (One researcher has referred to these constraints as "alibis.") The NHES first asks adults if they are interested in taking any adult courses (of whatever type is relevant to each survey section), then asks if they know of any relevant courses. Only those who are interested and know of courses respond to barriers questions (broadly categorized as time, money, childcare, and transportation barriers). So one potential barrier, the unavailability of relevant courses, is not considered (since one cannot determine if those who do not know of courses looked but could not find a course, or simply did not look for one—which might make one question their "interest"). Yet, other problems arise when one includes those who do not have any information on relevant courses; there is no easy solution to the difficulties of asking about barriers. In short, procedures for asking about barriers need further methodological development; current NHES work on this topic should be helpful.

In general, the "goals, incentives, and disincentives" approach to studying adult learning needs to be reevaluated within the larger context of the decision-making model; see the listing of "conceptual and measurement issues."

5b1. ***Among those interested in ABE programs, what benefits are perceived and what hindrances outweigh these? Among those not interested, what factors contribute to the perception that programs offer no benefits?***
—and—
5b2. ***What are the motivating factors (incentives) among those who participate in each type of adult basic education program (ABE, ASE, ESL)?***

The NHES is the only survey that separates adult basic education programs from types of ABE programs (ESL vs. other basic education). As discussed above, the NHES cannot tell us much about inducements to participate in these programs. (We only know if the course is taken for a job-related or personal reason, which does not tell us what the "inducement" or "incentive" is, but rather, from what sphere of life the inducement is coming from.) The NHES does ask about barriers but, as noted above, there are problems with this question. No questions are asked of those who are not interested in ABE.

The NLS–Y and SIPP ask about participation in federal training programs for disadvantaged workers, including JTPA, Job Corps, and Vocational Rehabilitation (among others). (Although these are not technically "adult basic education" programs, they are targeted to a similar population.) There is little information on what motivates individuals to participate in these programs within these surveys, presumably because the motivation is obvious (to get a job).

A more fundamental problem arises when one attempts to examine those interested and not interested in ABE programs. An underlying question in such analyses is "why aren't more people interested in these programs?"—resting on the implicit assumption that we can identify those who "should" be interested in ABE programs. For example, anyone without a high school diploma (or its equivalent) may be presumed to fall into this group; but if a high school drop-out is making a comfortable living without the need for further education, is it appropriate to assume that s/he should want to obtain a GED? More generally, a lack of interest in further learning among those with low attainment or achievement levels may signify a rational response to life conditions; this response may be just as reasonable as would be a lack of interest by a bachelor's degree holder to earn a Ph.D. (in spite of the fact that doctorate degree holders earn more). Thus, it may not be realistically possible to determine who "should" be interested in participating, unless one assumes that certain skill or education levels are unacceptable regardless of the individual's life conditions (which may be a reasonable assumption, from a society-wide point of view, but not from an individual's point of view).

6. Investments in Adult Learning

6a. *Who pays the financial costs for adults' participation in learning activities (particularly work-related activities)?*

If one is interested in knowing who pays for a course offering (the instructor, curriculum development, classroom space, etc.), this question probably cannot be well addressed in any survey of adults. In many cases, the adult learner will not have this information. For example, a community college course may be subsidized by the state or federal government, or by a private foundation, without the learner's knowledge.

To answer this question well would require a survey of providers, but we cannot identify the universe of providers from which to sample. Funding for employer-supported training and postsecondary education, however, can be determined from surveys of those providers; the NES and SEPT have provided estimates of employer support (see Q3 below), and NCES' postsecondary surveys collect information on postsecondary funding in general (although not for adult education specifically).

An easier question for adults to answer is how much they pay for attendance, and who covers the learner's tuition/fees, course materials, and transportation costs. The NHES asks how much money the learner pays out-of-pocket for course expenses, and whether the employer paid all or part of these expenses. The IALS asks who "financially supported" course attendance, with one option being "no fees" (the implication seems to be that this question asks about learner costs, not course costs); this question is planned to be included on ILSS as well (with "no direct expenses" as a response option).

The SIPP and NLS–Y collect fairly detailed information on who pays the costs of attendance. For education programs, SIPP respondents are asked about tuition and fees paid, scholarships or waivers received, room and board costs, transportation costs, and if the coursetaking is employer-assisted, whether the classes were taken as paid working hours and several other factors. For training, SIPP questions were asked about out-of-pocket costs, whether wages were paid for training time, and other factors. The NLS–Y asks who pays the costs of attendance, including "self or family," and whether costs were paid by a number of federal programs, such as JTPA, the Trade Adjustment Act,, Veteran's Administration, Pell Grants, or Stafford Loans (among others).

The duration of the course also provides a measure of opportunity costs (available in NHES, IALS, ILSS, and SEPT; see summary in "Participation Levels and Patterns" section). This information should be combined with information on whether the employer provided time off with pay (if the course is taken during working hours), or whether the course was taken during off-work hours. No survey asks specifically if a learner is given time off with pay (the assumption seems to be that courses taken during working hours are taken with pay, those taken outside of working hours without pay). The ILSS is expected to ask about whether the course is offered during working hours. The NELS asks whether work-related courses were taken during working hours, but it only asks about courses taken in general, not about specific courses, and does not have a course duration measure.

6a1. ***How much do participants pay to attend adult basic education programs, and what do these participant costs cover?***

See Question 1 above. Although a few surveys ask how much participants pay to attend courses (NHES, SIPP, NLS–Y), detailed information on what these participant costs cover (tuition and fees, transportation, childcare, etc.) is collected only on the SIPP.

6a2. ***How often and to what extent do employers invest in workforce training? Trends over time?***

The number of employers that invest in workforce training is available from the two employer surveys (NES and SEPT). These surveys also collect information on the extent to which employers invest in training (the amount of money invested). The NES asks for a global estimate, and may be of questionable reliability. The SEPT breaks out types of costs explicitly and asks for factual amounts, so it is probably more reliable. Since neither of these surveys is scheduled to be repeated, trend data (or *any* future data) on this issue are not available.

6b. ***How do adults finance their education activities?***

For adults enrolled in postsecondary programs, the NPSAS (and thus the BPS and B&B) and IPEDS provide detailed information on financial aid and other funding sources. The SIPP asks about the use of student grants and loans to pay educational costs, including the overall amount of such loans. The NLS–Y asks about student loans, grants, and scholarships. For other adult enrollments, there is no information on how adults obtain the money for education costs. This has largely been an issue for adults enrolled part-time in postsecondary programs; for those enrolled in individual courses, federal aid (and most state aid?) is typically not available. The availability, however, of new federal programs for adult learners (see "Government Role in Adult Learning") makes this issue more relevant for all adults.

6c. ***How much and what types of employer support and incentives are offered for adult learning activities (time off, offerings on-site, link to bonuses or raises, tuition reimbursements, etc.)?***

Beyond information on whether employers cover course costs (discussed above), the best data on employer support and incentives come from the two employer surveys (neither of which is scheduled to be repeated). The SEPT asks employers whether they provide any of the following types of training support: tuition reimbursement, financing for off-site training/conference attendance, training resource center, training advice during annual reviews, individualized or occupation-specific training plans, mentoring or apprenticeship programs, or contributions to union/association training funds. The 1994 NES is less detailed, but asks whether the employer has a formal training plan, offers or pays for any of a long list of types of formal training, whether the employer provides informal instruction, whether training programs are evaluated, and the use of outsources for trainers. The 1996 NES asks employers, *for each of five classes of workers*, whether the employer offers tuition reimbursements or time off for taking courses; the collection of these data by class of worker is an improvement over past surveys. (The 1997 NES used the same approach to ask which groups of workers received these benefits.) As mentioned above, both surveys collect information on total costs dedicated to training.

The NHES also asks participants whether they received any of the following types of employer support and incentives: Requirement to take a course, time off with or without pay, classroom space, and payment of all or part of costs (asked for all types of activities except "other structured activities" for which a yes/no question about receipt of any employer support is asked). The NELS Fourth Follow-up asks those participating in training whether the training was offered during work hours on the employer's premises or during work hours elsewhere, and whether the employer provided tuition aid or financial assistance for attending an education institution.

Table 2—Learning domains, types of skills and goals/incentives

	Learning Domain (broad typology based on area of life to which skills/knowledge applies)		
	Work-life		Personal (non-work) life
	Current job	Future job	
Specific Types of Skills/Knowledge	Computer skills Prof./tech writing skills Management skills ... Basic skills Health and safety ...		Computer skills Basic skills Health issues Exercise and fitness Child care Personal finance ...
Goals/Inducements **—Intended benefits** **and**	Improve performance Make more money, raise Promotion ...		Personal interest or enjoyment Organize home life Prepare for retirement Better manage money Get or stay fit Deal better with health issues ...
External Inducements **—external incentives** **and** **—requirements**	"Encouraged" by employer Required by prospective employer Required by current employer Professional requirement Welfare requirement		

7. Adult Learning Providers

7a. ***What organizations (1) offer learning activities for adults, (2) fund learning activities for adults, and (3) provide curricula for adult learning activities?***

Note that this provider question is limited to who sponsors learning activities; this question does not address the issue of how these offerings are delivered (such as through distance education, Internet-based courses, etc.). The issue of instructional delivery methods is addressed in the following section.

We can get a fairly complete list of institutions that offer (formal) learning activities from the NHES, which includes a list of providers for each of the learning activities adults can report (one ESL program, one basic skills/GED program, one apprenticeship program, up to 3 postsecondary credential programs, up to 6 work-related courses, and up to 3 "other structured activities"). This leaves out a few programs for a few individuals, too few to be concerned about. For ESL and basic skills/GED instruction, the NHES asks for both the institution that "provides the instruction" and the location where the instruction is offered. For credential, job-related and "other" courses, the NHES asks for the institution that provided the instruction, but not for the location where the instruction was provided.

The ILSS, SIPP, NLS–Y, and B&B/BPS also include lists of providers, although their lists are less extensive and are not always linked to specific courses. The ILSS proposes to ask, for three randomly selected courses, who provided the instructor for the course. The SIPP asks for the name of the organization that sponsors (or pays for) the training and where it takes place. The NLS–Y includes a provider list for job-training courses that combines some aspects of who provides the training with how the training is provided. The list includes the following: Business schools, vocational or technical institutes, correspondence courses, apprenticeship programs, company training run by employer, work seminar or program run by someone other than employer, seminar or training programs outside of work, vocational rehabilitation center, government training agency, and other. The BPS/B&B is limited to those who enrolled in (or completed) a postsecondary program; for this group, respondents who are engaged in employer-provided training are asked if the training was provided by (taught by) the employer/an employee, or by an outside vendor.

For most purposes, it may be necessary only to distinguish between a limited number of providers, such as postsecondary institutions, employers, commercial agencies, government agencies, and labor unions. Thus, the more abbreviated lists in ILSS, SIPP, NLS–Y, and BPS/B&B may be sufficient for most purposes.

One problem with *all* "provider" data is that the respondent may not be able to distinguish between who sponsors (pays for) the instruction, who provides (teaches) it, and where it is offered. For example, an employer may pay for a community college to offer instruction that is provided at the worksite or at a local high school. Or the government might fund training grants for workers through local community colleges. What a respondent would list for a "provider" in such situations is unclear. Government support, in particular, is likely to be underreported since adults are often unaware that such support exists.

These difficulties explain why surveys typically do not ask the learner who funds learning activities or provides the curriculum for these activities. The SIPP and NLS–Y do ask respondents if their learning activities receive employer or government support (options for government support focus on federal programs for the disadvantaged). The NHES asks if employers provide "funding" in terms of time-off from work, classroom space, or payment of participant costs (asked of all coursetaking except "other," for which only a general question on employer support is asked). The ILSS plans to ask who financially supports the respondents' participation in courses (but not in formal education programs).

In sum, we can get information that should be reasonably valid in most cases for who offers learning opportunities from the NHES and ILSS, and for a limited population of adults, BPS/B&B. The SIPP and NLS–Y provide reasonably good data on providers of work-related training. Information on who funds such opportunities and on who develops the instructional curricula cannot be obtained from surveys of participants; that information is best collected from a survey of providers, assuming a universal list of providers could be obtained. Without such a list, surveys of employers allow us to collect some detail on funding and curriculum for these providers. The NES and SEPT both collect information on how much money employers devote to training activities. The NES asks about the use of vendor-sponsored training (presumably meaning that the curricula are supplied by the vendors), while the SEPT asks who the instructor is (presumably the instructor provides the curriculum).

7b. **How extensive a role do formal education institutions and employers play in the provision of adult learning activities? Changes over time?**

—and—

7b1. **What is the role of postsecondary institutions in the larger service delivery system for adults?**

To compare the *magnitude* of formal education and employer-sponsored training would require that comparable instructional-time measures be collected for each type of activity. The NHES has the best data in this regard, but recent analyses suggest that there are validity and reliability problems with the instructional-time data. The ILSS may also collect instructional time data (for all activities other than education *programs*). The SIPP asks about full-time versus part-time participation in formal education programs and for gross duration measures of formal training programs (less than a day, a day, a week, a month, more than a month); these could provide rough estimates of the magnitude of formal education versus training. No other survey has instructional-time data on both formal education and employer-sponsored training activities. (As mentioned previously, the best data on course duration come from the SEPT, but those data apply only to employer-provided training and are not scheduled to be collected in the future.)

To compare the *incidence* of formal education and employer-sponsored training, all surveys that provide a list of providers (including postsecondary institutions and employers) could be used. As discussed in Q1 above, the NHES, ILSS, SIPP, and NLS–Y are probably the best surveys for this purpose. The issues, however, raised in Q1 also apply here; it is not clear that we can collect accurate data on providers in all situations.

7b2. ***Are employers offering more or less training to employees now compared to in the past?***

Employer offerings can only be determined from surveys of employers, and these have very limited time series. The Bureau of Labor Statistics has conducted a few employer surveys over the years (1983, 1991, 1993, and 1995; the 1983 and 1991 surveys were CPS supplements), which seem to indicate a growth in employer offerings, but no future employer surveys are planned. The NES has data on offerings for 1994 and 1997 (and possibly in 2000), but again no future surveys are planned beyond the year 2000. We can approximate changes in employer offerings if one assumes that changes in participation in employer-provided training reflects changes in offerings (rather than changes in employees' propensity to participate in offerings); for this purpose, the SIPP and NHES provide trend data on participation in employer-sponsored training. (NHES questions on this topic have not been very consistent in the past, but should be more consistent in the future, as the questionnaire is perfected.)

It would also be interesting to ask employees about training opportunities that are available at work, including informal opportunities, since informal training may be becoming more popular and prevalent, and/or may be replacing formal opportunities. For example, workers could be asked whether their employer has a training center, provides training materials such as manuals, CD-ROMs, or Internet access for training purposes, etc. (See discussion under costs and incentives as well.)

Ideally, it would be useful to know not just how the level of employer-sponsored training is changing, but in what ways it is changing—what changes are occurring in the type of training offered, and in the methods of training that are used. The NHES provides limited information on the type of training (whether ESL, ABE/GED, etc.; goals of training; subject of training).

Another way to approach this issue is to examine changes over time in the proportion of adults who participate in learning activities that receive employer support. For this approach, the data sets that contain information on employer support (see discussion above on "Investments in Adult Learning") could be used. NCES has recently conducted a cross-sectional analysis of this type, examining employer aid for postsecondary education using NPSAS and NHES/AE data.[1]

7c. Where do workers get their education and training?

This question can be addressed by a survey of either all adults or of employed adults. Determining who "provides" the education and training can be difficult, however, as explained in Q1 above. Also, the typical survey of adults (such as NHES and ILSS) asks about education and training experiences over an extended period of time (e.g., 12 months) but only about current work status—so we typically cannot tell if someone was employed *at the time* that they participated in the education or training activity. An employee survey, such as the employee component of the SEPT, is preferable in this regard. Another alternative is to use the approach taken by the NLS–Y or SIPP, both of which focus on job training. The NLS–Y asks about training activities within the context of the adult's work history, so that each training activity is linked to a particular employer. The SIPP asks about training that was received to improve skills "while working." (Separate SIPP questions ask about training to obtain a new job, to which current or prospective workers can respond.)

7d. For each type of adult basic education program (ABE, ASE, ESL), what proportion of the teaching force is voluntary versus paid staff, full-time versus part-time?

—and—

7e. ***What proportion of the adult basic education teaching force has formal education training? Formal training to educate adults?***

—and—

7e1. ***What proportion of the adult basic education teaching force has formal training in diagnosing and instructing students with learning disabilities?***

—and—

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[11] See Lee, J.B., and Clery, S.B. (1999). Employer Aid for Postsecondary Education. Washington, DC: US Department of Education, National Center for Education Statistics (NCES 1999–181).

7e2. ***What proportion of the adult basic education teaching force has formal training in alternative learning styles and instructional methods?***

Andy Kolstad noted that one important issue is the extent to which ABE instructors have formal training in special education or instructing those with learning disabilities. This should be added to our list of issues. (We can add it to Q5.)

There are no national data on the adult basic education teaching force, other than what may be included in past national evaluations of adult literacy programs. It is difficult to collect information on these instructors because of the variety of organizations and agencies—voluntary church and community organizations, national philanthropic/literacy organizations, government agencies, etc.—for which they might work.

There are some related data available on formal training as represented by a degree in adult education. The IPEDS can tell us the number of degrees awarded in adult education, and NSOPF can tell us the number of postsecondary instructors who have a degree in adult education. Yet, we cannot link either IPEDS or NSOPF data to whether or not an instructor teaches adult basic education. Also, many instructors may not have majored in adult education, but may have taken a course on the topic; this cannot be determined from any existing data set at either the postsecondary or elementary/secondary levels. The Schools and Staffing Survey (SASS) excludes those who teach exclusively adults, and does not ask other teachers whether they teach adults.

Our data would be incomplete, even with more information on "regular" teachers, as many adult basic education courses may be taught by instructors who are not elementary/secondary or postsecondary teachers. There are two potential ways to get information on the larger population of ABE instructors. First, state offices of adult education could be surveyed about requirements they have for state ABE grantees. This will not cover the entire universe of programs, but should cover many of them; it also will not tell us the extent to which the expertise listed in the questions above exists, but will tell us the extent to which such expertise is sought.

The second method is to review the national evaluations that have been done on ABE. These studies can be reviewed to see what information they have on staff qualifications, and also to determine their procedures for developing a universe list (sampling frame) for course providers; NCES could consider developing its own universe list, should that prove feasible. National evaluations have been done by Development Associates (poor data quality), Pelavin (adult ESL programs), Mathematica (Mary Moore, work-based literacy programs), and Abt (current study of ABE). Steve Reder, of NCSALL (National Center for the Study of Learning and Literacy) is also currently working on a longitudinal study of ABE programs in the Portland, Oregon area. (Lisa has information on this study.) Andy Hartman of NIFL (National Institute for Literacy) may be another source of information, as well as John Comings of NCSALL.

8. Instructional Delivery and New Technologies

8a. ***What instructional delivery methods are used in adult learning activities?***

The only survey that has detailed information on instructional delivery methods is the SEPT. This survey asks if training is provided through classroom instruction, small-group or one-on-one discussion, via a computer tutorial, by video, through hands-on learning, or by observation. This survey obviously includes only a limited (although large) part of all adult learning. The 1999

NHES/AE asks whether courses were taken via distance education and the ILSS may include a similar question.

For for-credit postsecondary education courses, the NSOPF distinguishes among classes taught by lecture/discussion, seminar, lab/clinic, apprenticeship/field work, or other; and among those that involve face-to-face, computer, TV-based, or other interactions. If all postsecondary education is considered "adult learning," the NSOPF is a useful source of information. If one wants to exclude the "traditional" student, however, the NSOPF is of more limited use, since NSOPF courses cannot be specifically identified as adult or continuing education classes; they can only be linked to faculty who teach more or fewer continuing education courses.

8b. **How are technology-based programs developed and offered?**

Most data on this issue are restricted to questions about distance education. The most comprehensive source of information on the structure of distance education programs comes from the 1995 and 1998 PEQIS surveys on distance education. No other survey of providers collects information about technology-based programs or courses.

From surveys of adults, a few questions that can be used to examine the extent to which adults participate in technology-based programs/activities exist. The 1995 NHES includes one question asking about the use of computer or video instruction for job-related training. The 1999 NHES/AE asked if instruction (in every area except apprenticeships) occurred through distance education and if so, the specific technologies that were used for student-instructor communications (radio or TV, e-mail, Internet, satellite broadcasts, video conferencing, computer conferencing, other).

The NLS–Y asks about self-paced learning activities (related to work) that include computer-assisted teaching programs; but these programs are not separated in the survey from other self-paced methods, such as the use of manuals or workbooks.

The ILSS may ask if each of three randomly selected courses (as well as formal education programs) is taken through distance education and if they were, whether they used Internet; television, radio or videotapes; or correspondence. Note the difference in alternatives provided by NHES/AE and ILSS; questions in this area have clearly not yet been standardized.

8c. **What proportion of adults use new technologies at home in order to acquire new knowledge or skills? What technologies are used, and how often?**

The CPS is the only survey that asks adults whether they have computers at home. The CPS asks how often home computers are used and if they are used for word-processing, spreadsheet work, etc., but does not explicitly ask about skill/knowledge development or about whether the computer is used for work-related reasons or personal reasons. Also, since the CPS asks about formal education only (no other forms of adult learning) information on technologies used at home can only be linked to participation in formal education, not to adult learning in general.

As discussed above, the 1999 NHES/AE asks whether adults participated in a learning activity that involved a computer-based distance education delivery method, but we cannot tell whether home computers are used for this instruction (as opposed to, for example, computers at a local high school or community center).

8b1. **What are the trends in the use of computer and telecommunication technologies for adult instructional delivery?**

—and—

8d. ***How many adults, and which adults, participate in learning activities utilizing a technology-based delivery system?***

As previously discussed, the 1995 NHES has a question asking about the use of computers for job-related instruction and the 1999 NHES/AE asks whether any courses (other than apprenticeship) were taken via distance education. This is the only source of trend data on this topic. The SEPT also asks whether employer-provided training is provided via a computer tutorial or video, but that was a one-time survey and included only employer-sponsored training.

As mentioned above, the NSOPF distinguishes among classes that involve face-to-face, computer, TV-based, or other interactions. These courses cannot be specifically identified as adult or continuing education classes or linked to specific groups of students, but they can be linked to faculty who teach more or fewer continuing education courses.

8d1. **How many adults are enrolled in adult basic education programs that use new technologies?**

This question can be answered with reference to the use of distance education. The 1999 NHES/AE asks participants in ESL and ABE/GED programs whether their programs involved distance education (and its specific delivery system). The ILSS also asks about distance education as a delivery method. The ILSS does not explicitly ask about adult basic education programs, but does ask about the subject of each course, including "improvement of reading and writing skills," which may or may not be ABE/ASE, and whether enrolled program leads to a high school credential. So the ILSS can approximate participation in adult basic education, and link that information to the use of distance education. Computers can be used in other ways in adult basic education programs, but no data are available on the use of computers other than for distance education.

8e. ***What proportion of employers offer their employees technology-based instructional activities?*** *What types?*

The SEPT can provide this information, at least for the use of computer-based tutorials and video instruction. But this was a one-time survey; no ongoing surveys provide this information. This information should be collected through an employer survey, although surveys of workers could provide an indirect measure (i.e., the proportion of employees that participate in technology-based instructional activities). The 1999 NHES/AE could be used in this way, at least with regard to distance education courses.

8f. ***What proportion of postsecondary institutions offer technology-based courses for adults?*** *What types?*

—and—

8f1. ***What are the characteristics of postsecondary institutions that offer technology-based instructional programs?***

For one type of technology-based course, distance education courses, data are available from the 1995 PEQIS survey on distance education. Distance education courses *for adults* can be fairly well approximated. One question within the survey identifies the number of distance education courses targeted to ABE students, professional continuing education students, and other continuing education students; another question asks if professional or other workers are targeted by *any* distance education courses. (It would be helpful to add "workers" to the first question on number of courses.) The type of institutions that offer distance education can be identified through the PEQIS link to IPEDS data. A 1998 version of this PEQIS Distance Education survey does not provide any information on the students served by these programs, and so cannot tell us about distance education offerings for adults. The newer survey can only tell us about the institutions offering these programs.

For technology-based courses more generally, the NSOPF asks faculty members about how they teach their courses, including the use of new technologies (see discussion above). Yet, adult learners (if defined to exclude the "traditional" postsecondary student) cannot be separately identified in the NSOPF either.

8g. ***How many postsecondary institutions and employers offer distance education programs, and how many adults participate? To what sites? What groups of adults?***

As discussed above, the PEQIS surveys provide data on the number of postsecondary institutions that offer distance education programs; however, the number of adults (other than postsecondary students in general) participating in these programs is not available. Specific groups of adults targeted by distance education programs are broadly defined as indicated above. There is also information on the sites targeted by programs, but the sites targeted cannot always be linked to programs designed specifically for adults. ("Work sites" and "correctional facilities" are two of the target sites that seem likely to be designed for adults, and would be interesting to examine independent of the group targeted.)

No information is available on the number of employers that offer distance education courses, or that sponsor employee participation in distance education courses.

8h. ***What proportion of provider-institutions (schools, etc.) have advanced technologies that are capable of instructional delivery?***

There are no data on this issue; a provider survey would be needed to answer this question. As an alternative, questions could be added to postsecondary institution surveys and employer surveys to ask about the availability of new technologies (hardware and software) that could be used for instructional purposes.

9. Informal Learning

9a. ***What informal education and training methods do workers use?***

—and—

9b. **How much of adult learning is formal versus informal?**

—and—

9b1. ***To what extent do workers use formal or informal methods to develop and update skills and knowledge?***

—and—

9b2. ***What shifts are occurring over time in adults' participation in formal versus informal learning?***

—and—

9b3. ***What is the relationship between participation in formal and informal education?***

Most surveys include only formal learning activities. The only exceptions to this are the SEPT and NLS–Y, which include informal *work-related* learning activities (as well as formal work-related activities). Both of these surveys appear to be good sources for comparing the relationships between formal and informal training, with the obvious limitation that they do not provide information on learning for reasons other than work. On the SEPT, formal activities are defined as structured, and planned in advance, and informal as unstructured and unplanned. Because the SEPT uses employee-training logs, kept daily over a two-week (10-day) period, these data appear to be quite reliable. To address how workers initially develop their skills, the SEPT asks workers how they learned the skills required on their current job—through formal training, informal training, or on their own—and which method was most important.

The NLS–Y asks about informal training taken within the past four weeks, defined as supervisor training, coworker training, or self-paced instruction. The restriction to four weeks helps ensure that these data are reliable. (Informal activities are likely to be of shorter duration and more "unstructured" than formal activities, and thus are probably less easy to recall over a longer period than are formal activities.) NLS–Y findings on informal learning can be converted to a longer time frame to allow comparison with participation in formal learning activities. The NLS–Y asks respondents which of a range of formal and informal learning activities (taken within the past four weeks) was most important for their job—supervisor training, coworker training, self-paced training, classes and seminars, trial and error, previous job experience, learning by doing, and reading.

The ILSS may also ask about participation in informal work-related education, but since this information will be collected retrospectively over the past 12 months, it will not be as reliable as the SEPT or NLS–Y data. Thus, from the SEPT, NLS–Y and potentially the ILSS, one can answer questions 2 and 3 above; questions 1 and 4 can be answered with regard to work-related training; question 5 might be addressed by the NLS–Y, to the extent that it provides comparable data over time.

It would seem feasible to ask about informal work-related activities on other adult surveys, such as NHES or SIPP, but expanding these surveys to include all types of informal learning might be infeasible. Some activities that are often classified as "nonformal" such as attending a (nonwork-related) lecture, might be feasible to add. The opportunity, however, to participate in such activities tends to vary greatly depending on where people live, so it would be difficult to determine whether participation rates in these types of activities reflect interest or access.

10. Services and Accommodations for Adults

10a. ***To what extent are postsecondary institutions providing alternative offerings or delivery methods that meet the needs of adults (e.g., contract training)?***

Other than the data discussed above on distance learning, there are no data on this issue. To address this, one would first have to define the alternative offerings and delivery methods that are of interest (i.e., that meets the needs of adults). Then the relevant questions could be asked of postsecondary institutions, perhaps in a PEQIS survey. Since many institutions, however, particularly community colleges, do attempt to meet adults' needs, the focus should be on finding out *how* and *how much of* an institution's programming (in general and for adults) is "adapted" to meet adults' needs.

10b. ***To what extent are postsecondary institutions and other providers offering competency-based assessment, portable credentials, or other outcome-based approaches to document adults' skill and knowledge acquisition?***

—and—

10c. ***To what extent are postsecondary institutions and other providers offering support services or other special accommodations to better serve adult learners?***

Both of these questions are mainly pertinent to postsecondary institutions, rather than other types of providers. There are no data currently available to address these issues, at least from NCES or other federal offices. It was mentioned that SHEEO (State Higher Education Executive Officers) might have either quantitative or qualitative data on these topics. We also noted that answering the second question requires the development (in cooperation with relevant providers) of a list of relevant services and accommodations. Some of these services and accommodations are likely to be well established (e.g., correspondence courses, evening and weekend offerings, short courses) and others are likely to be newer and less prevalent (e.g., childcare, distance education, public transport, security services). Some accommodations, such as basic skills open-entry/open-exit offerings, are also being reevaluated in light of evidence that they may make instruction less effective.

We noted that while a provider survey is necessary to find out about the full range and extent of offerings, questions on a survey of adult learners could provide related information on the extent to which these services/accommodations are used or desired, or to which their absence is perceived to be problematic.

10d. ***What is the extent of noncredit coursetaking within postsecondary institutions?***

The NSOPF asks faculty how many non-credit courses they teach. These data are available on a regular basis (every five years). However, these data may under-count non-credit course offerings, since (it is commonly believed that) non-credit courses are often taught by teaching assistants (i.e., graduate students).

10d1. ***How many and which adults participate in noncredit coursetaking, and for what purposes?***

The NSOPF cannot tell us about adult participation in noncredit courses. The NHES can provide an estimate for these figures, if one assumes that all courses provided by a postsecondary institution, other than those that are part of a postsecondary degree program, are noncredit courses. It would be better, however, to explicitly ask about postsecondary courses taken without credit, since the provider data may not be highly reliable. The NHES, if used as is, does allow for a determination of which adults participate in noncredit coursetaking, and for what purpose (broadly defined as current or future job needs, basic skills development, credential, or personal reasons).

11. Outcomes and Effectiveness

11a. ***To what extent do adults use the skills and knowledge gained from adult learning activities, at work or in their personal lives?***

This topic is addressed in NLS–Y, IALS, and will probably be included in ILSS. Also, the SIPP asks participants if the skills they acquired in a given learning activity were useful on the job. Steve Reder's longitudinal study of adult learning in the Portland area may also address this issue for adult basic education programs. These studies all collect data on adults' self-report of skills use.

11b. ***To what extent do adults judge their learning activities to provide specific job-related benefits (e.g., increased earning ability or job satisfaction)?***

The NLS–Y includes a global job satisfaction item that could be linked to participation in learning activities. More directly, however, the NELS Fourth Follow-up asks participants about a range of benefits that may be outcomes of participation (such as increased opportunities for promotion, wider range of job options, increased pay, job responsibilities or effectiveness); the ILSS may include a similar question. It would be advantageous to have a NELS-like question on surveys such as NHES or NLS–Y, where a broader range of adults and/or employment data are available.

11c. ***To what extent do adults participate in learning activities that result in a credential, and what type of credential do adults obtain?***

Data on college credentials are available from a number of sources, including NHES, SIPP, NALS, NLS–Y, and probably ILSS. The ILSS may also include a question asking about professional credentials. The BPS/B&B ask about college and other types of credentials (professional licenses, certificates, etc.) for those who attend or graduated from college; similar data for all adults are generally not available. The one exception is the NELS, which includes a question about the attainment of various types of professional licenses, but does not ask how or when they were obtained.

11d. ***What are the economic returns to adult participation in work-related activities? What economic costs and benefits do adults accrue through their participation?***

While it is not feasible for NCES to conduct the type of controlled study that could definitively answer this question, there are data sources that can provide strong evidence on this topic. The SIPP and NLS–Y both contain longitudinal data that allow us to track participation in work-related education and training, along with changes in income level and employment status. The NHES, ILSS, and CPS could also provide suggestive evidence, if a question were added about income level prior to the 12-month reference period. (Changes in income could be compared for those who had and had not participated in learning activities over the 12-month period, controlling for other factors.)

11d1. ***What are the returns to education for adults at different education attainment levels?***

This question is fairly well studied (Decker et al. 1997)[1], and can be addressed by any survey that includes individual-level measures of education, income/salary, and age and/or work experience (as controls). This includes the CPS, SIPP, NHES, NLS–Y, NALS, IALS/ILSS, and NELS. The postsecondary surveys are of limited use since their sample is restricted to those whose education level includes at least some college, but these surveys do differentiate well among the various postsecondary attainment levels.

11d2. ***What are the returns to employers for investing in employee training and education?***

—and—

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[1] See the NCES report *Education and the Economy: An Indicators Report*, #97–269.

11d3. ***Does the availability of employer-provided training affect employees' turnover rates?***

These are important questions, but may be better left for DoL to answer. There are data relevant on these issues in the NES and SEPT, but neither of these surveys is scheduled to be repeated (after 2000). The issue of returns to employers, like the issue of returns to individuals, is best answered through controlled studies, which are not feasible for NCES to conduct. Although, a survey of employers (such as the NES and SEPT) can provide suggestive information on this topic.[1] The NLS–Y and SIPP can probably provide data to answer the second question, as one could compare the employment histories of those who did and did not participate in employer-sponsored training.

12. Policies Related to Adult Learning

12a. ***To what extent do adults use the Hope Scholarship and the Lifelong Learning Tax Credit? Have these recent initiatives increased participation in adult learning?***

The 1999 NHES has data on use of the Hope Scholarship and the Lifelong Learning Tax Credit. Their effects on participation possibly could be examined by comparisons with data from the 1995 NHES. NPSAS 2000 will also collect information on the use of these incentives among college students. We do not know if the SIPP or NLS–Y surveys will include questions about these initiatives in future administrations, but they would be useful surveys in which to add such items.

12b. ***How does government and corporate support for adult learning (particularly for workers) in the US compare to that in other countries?***

The ILSS is attempting to address this issue, but it is difficult to do so through a survey of adults, since adults are often not aware of the existence or extent of government and corporate support. Most likely, this survey will only provide useful data on corporate support to workers. The OECD may have other data sources for this. A few years ago, Hong Tan did an international study of employer-sponsored training for the World Bank. We have not seen the results of this study. This is obviously a complicated issue that is probably best addressed through methods other than survey data collections.

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[1] Lisa Lynch has conducted a study on returns to employers using the NES data; see Lynch, L. (June, 1995). *Employer provided training in the manufacturing sector: First results from the United States*, paper presented at the World Bank Conference on Enterprise Training Strategies and Productivity.

Listing of NCES Working Papers to Date

Working papers can be downloaded as pdf files from the NCES Electronic Catalog (http://nces.ed.gov/pubsearch/). You can also contact Sheilah Jupiter at (202) 502-7444 (sheilah_jupiter@ed.gov) if you are interested in any of the following papers.

Listing of NCES Working Papers by Program Area

No.	Title	NCES contact
Baccalaureate and Beyond (B&B)		
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
Beginning Postsecondary Students (BPS) Longitudinal Study		
98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
Common Core of Data (CCD)		
95-12	Rural Education Data User's Guide	Samuel Peng
96-19	Assessment and Analysis of School-Level Expenditures	William J. Fowler, Jr.
97-15	Customer Service Survey: Common Core of Data Coordinators	Lee Hoffman
97-43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-03	Evaluation of the 1996–97 Nonfiscal Common Core of Data Surveys Data Collection, Processing, and Editing Cycle	Beth Young
2000-12	Coverage Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary School Universe Survey	Beth Young
2000-13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
Data Development		
2000-16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000-16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
Decennial Census School District Project		
95-12	Rural Education Data User's Guide	Samuel Peng
96-04	Census Mapping Project/School District Data Book	Tai Phan
98-07	Decennial Census School District Project Planning Report	Tai Phan
Early Childhood Longitudinal Study (ECLS)		
96-08	How Accurate are Teacher Judgments of Students' Academic Performance?	Jerry West
96-18	Assessment of Social Competence, Adaptive Behaviors, and Approaches to Learning with Young Children	Jerry West
97-24	Formulating a Design for the ECLS: A Review of Longitudinal Studies	Jerry West
97-36	Measuring the Quality of Program Environments in Head Start and Other Early Childhood Programs: A Review and Recommendations for Future Research	Jerry West
1999-01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
Education Finance Statistics Center (EDFIN)		
94-05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
96-19	Assessment and Analysis of School-Level Expenditures	William J. Fowler, Jr.
97-43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
98-04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
1999-16	Measuring Resources in Education: From Accounting to the Resource Cost Model Approach	William J. Fowler, Jr.

No.	Title	NCES contact
High School and Beyond (HS&B)		
95-12	Rural Education Data User's Guide	Samuel Peng
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
HS Transcript Studies		
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
International Adult Literacy Survey (IALS)		
97-33	Adult Literacy: An International Perspective	Marilyn Binkley
Integrated Postsecondary Education Data System (IPEDS)		
97-27	Pilot Test of IPEDS Finance Survey	Peter Stowe
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
2000-14	IPEDS Finance Data Comparisons Under the 1997 Financial Accounting Standards for Private, Not-for-Profit Institutes: A Concept Paper	Peter Stowe
National Assessment of Adult Literacy (NAAL)		
98-17	Developing the National Assessment of Adult Literacy: Recommendations from Stakeholders	Sheida White
1999-09a	1992 National Adult Literacy Survey: An Overview	Alex Sedlacek
1999-09b	1992 National Adult Literacy Survey: Sample Design	Alex Sedlacek
1999-09c	1992 National Adult Literacy Survey: Weighting and Population Estimates	Alex Sedlacek
1999-09d	1992 National Adult Literacy Survey: Development of the Survey Instruments	Alex Sedlacek
1999-09e	1992 National Adult Literacy Survey: Scaling and Proficiency Estimates	Alex Sedlacek
1999-09f	1992 National Adult Literacy Survey: Interpreting the Adult Literacy Scales and Literacy Levels	Alex Sedlacek
1999-09g	1992 National Adult Literacy Survey: Literacy Levels and the Response Probability Convention	Alex Sedlacek
2000-05	Secondary Statistical Modeling With the National Assessment of Adult Literacy: Implications for the Design of the Background Questionnaire	Sheida White
2000-06	Using Telephone and Mail Surveys as a Supplement or Alternative to Door-to-Door Surveys in the Assessment of Adult Literacy	Sheida White
2000-07	"How Much Literacy is Enough?" Issues in Defining and Reporting Performance Standards for the National Assessment of Adult Literacy	Sheida White
2000-08	Evaluation of the 1992 NALS Background Survey Questionnaire: An Analysis of Uses with Recommendations for Revisions	Sheida White
2000-09	Demographic Changes and Literacy Development in a Decade	Sheida White
National Assessment of Educational Progress (NAEP)		
95-12	Rural Education Data User's Guide	Samuel Peng
97-29	Can State Assessment Data be Used to Reduce State NAEP Sample Sizes?	Steven Gorman
97-30	ACT's NAEP Redesign Project: Assessment Design is the Key to Useful and Stable Assessment Results	Steven Gorman
97-31	NAEP Reconfigured: An Integrated Redesign of the National Assessment of Educational Progress	Steven Gorman
97-32	Innovative Solutions to Intractable Large Scale Assessment (Problem 2: Background Questionnaires)	Steven Gorman
97-37	Optimal Rating Procedures and Methodology for NAEP Open-ended Items	Steven Gorman
97-44	Development of a SASS 1993–94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
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1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
National Education Longitudinal Study of 1988 (NELS:88)		
95-04	National Education Longitudinal Study of 1988: Second Follow-up Questionnaire Content Areas and Research Issues	Jeffrey Owings

No.	Title	NCES contact
95-05	National Education Longitudinal Study of 1988: Conducting Trend Analyses of NLS-72, HS&B, and NELS:88 Seniors	Jeffrey Owings
95-06	National Education Longitudinal Study of 1988: Conducting Cross-Cohort Comparisons Using HS&B, NAEP, and NELS:88 Academic Transcript Data	Jeffrey Owings
95-07	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
95-12	Rural Education Data User's Guide	Samuel Peng
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
96-03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
98-06	National Education Longitudinal Study of 1988 (NELS:88) Base Year through Second Follow-Up: Final Methodology Report	Ralph Lee
98-09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
1999-15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
National Household Education Survey (NHES)		
95-12	Rural Education Data User's Guide	Samuel Peng
96-13	Estimation of Response Bias in the NHES:95 Adult Education Survey	Steven Kaufman
96-14	The 1995 National Household Education Survey: Reinterview Results for the Adult Education Component	Steven Kaufman
96-20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96-21	1993 National Household Education Survey (NHES:93) Questionnaires: Screener, School Readiness, and School Safety and Discipline	Kathryn Chandler
96-22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
96-29	Undercoverage Bias in Estimates of Characteristics of Adults and 0- to 2-Year-Olds in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
96-30	Comparison of Estimates from the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97-02	Telephone Coverage Bias and Recorded Interviews in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-03	1991 and 1995 National Household Education Survey Questionnaires: NHES:91 Screener, NHES:91 Adult Education, NHES:95 Basic Screener, and NHES:95 Adult Education	Kathryn Chandler
97-04	Design, Data Collection, Monitoring, Interview Administration Time, and Data Editing in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-05	Unit and Item Response, Weighting, and Imputation Procedures in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97-06	Unit and Item Response, Weighting, and Imputation Procedures in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97-08	Design, Data Collection, Interview Timing, and Data Editing in the 1995 National Household Education Survey	Kathryn Chandler
97-19	National Household Education Survey of 1995: Adult Education Course Coding Manual	Peter Stowe
97-20	National Household Education Survey of 1995: Adult Education Course Code Merge Files User's Guide	Peter Stowe
97-25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
97-28	Comparison of Estimates in the 1996 National Household Education Survey	Kathryn Chandler
97-34	Comparison of Estimates from the 1993 National Household Education Survey	Kathryn Chandler
97-35	Design, Data Collection, Interview Administration Time, and Data Editing in the 1996 National Household Education Survey	Kathryn Chandler
97-38	Reinterview Results for the Parent and Youth Components of the 1996 National Household Education Survey	Kathryn Chandler

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97-39	Undercoverage Bias in Estimates of Characteristics of Households and Adults in the 1996 National Household Education Survey	Kathryn Chandler
97-40	Unit and Item Response Rates, Weighting, and Imputation Procedures in the 1996 National Household Education Survey	Kathryn Chandler
98-03	Adult Education in the 1990s: A Report on the 1991 National Household Education Survey	Peter Stowe
98-10	Adult Education Participation Decisions and Barriers: Review of Conceptual Frameworks and Empirical Studies	Peter Stowe
National Longitudinal Study of the High School Class of 1972 (NLS-72)		
95-12	Rural Education Data User's Guide	Samuel Peng
National Postsecondary Student Aid Study (NPSAS)		
96-17	National Postsecondary Student Aid Study: 1996 Field Test Methodology Report	Andrew G. Malizio
National Study of Postsecondary Faculty (NSOPF)		
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2000-01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
Postsecondary Education Descriptive Analysis Reports (PEDAR)		
2000-11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Private School Universe Survey (PSS)		
95-16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-17	Estimates of Expenditures for Private K–12 Schools	Stephen Broughman
96-16	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
96-26	Improving the Coverage of Private Elementary-Secondary Schools	Steven Kaufman
96-27	Intersurvey Consistency in NCES Private School Surveys for 1993–94	Steven Kaufman
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98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
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Recent College Graduates (RCG)		
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94-02	Generalized Variance Estimate for Schools and Staffing Survey (SASS)	Dan Kasprzyk
94-03	1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report	Dan Kasprzyk
94-04	The Accuracy of Teachers' Self-reports on their Postsecondary Education: Teacher Transcript Study, Schools and Staffing Survey	Dan Kasprzyk
94-06	Six Papers on Teachers from the 1990–91 Schools and Staffing Survey and Other Related Surveys	Dan Kasprzyk
95-01	Schools and Staffing Survey: 1994 Papers Presented at the 1994 Meeting of the American Statistical Association	Dan Kasprzyk
95-02	QED Estimates of the 1990–91 Schools and Staffing Survey: Deriving and Comparing QED School Estimates with CCD Estimates	Dan Kasprzyk
95-03	Schools and Staffing Survey: 1990–91 SASS Cross-Questionnaire Analysis	Dan Kasprzyk
95-08	CCD Adjustment to the 1990–91 SASS: A Comparison of Estimates	Dan Kasprzyk
95-09	The Results of the 1993 Teacher List Validation Study (TLVS)	Dan Kasprzyk
95-10	The Results of the 1991–92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation	Dan Kasprzyk

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95-11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
95-12	Rural Education Data User's Guide	Samuel Peng
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
95-15	Classroom Instructional Processes: A Review of Existing Measurement Approaches and Their Applicability for the Teacher Follow-up Survey	Sharon Bobbitt
95-16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-18	An Agenda for Research on Teachers and Schools: Revisiting NCES' Schools and Staffing Survey	Dan Kasprzyk
96-01	Methodological Issues in the Study of Teachers' Careers: Critical Features of a Truly Longitudinal Study	Dan Kasprzyk
96-02	Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association	Dan Kasprzyk
96-05	Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey	Dan Kasprzyk
96-06	The Schools and Staffing Survey (SASS) for 1998–99: Design Recommendations to Inform Broad Education Policy	Dan Kasprzyk
96-07	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk
96-09	Making Data Relevant for Policy Discussions: Redesigning the School Administrator Questionnaire for the 1998–99 SASS	Dan Kasprzyk
96-10	1998–99 Schools and Staffing Survey: Issues Related to Survey Depth	Dan Kasprzyk
96-11	Towards an Organizational Database on America's Schools: A Proposal for the Future of SASS, with comments on School Reform, Governance, and Finance	Dan Kasprzyk
96-12	Predictors of Retention, Transfer, and Attrition of Special and General Education Teachers: Data from the 1989 Teacher Followup Survey	Dan Kasprzyk
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96-23	Linking Student Data to SASS: Why, When, How	Dan Kasprzyk
96-24	National Assessments of Teacher Quality	Dan Kasprzyk
96-25	Measures of Inservice Professional Development: Suggested Items for the 1998–1999 Schools and Staffing Survey	Dan Kasprzyk
96-28	Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection	Mary Rollefson
97-01	Selected Papers on Education Surveys: Papers Presented at the 1996 Meeting of the American Statistical Association	Dan Kasprzyk
97-07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
97-10	Report of Cognitive Research on the Public and Private School Teacher Questionnaires for the Schools and Staffing Survey 1993–94 School Year	Dan Kasprzyk
97-11	International Comparisons of Inservice Professional Development	Dan Kasprzyk
97-12	Measuring School Reform: Recommendations for Future SASS Data Collection	Mary Rollefson
97-14	Optimal Choice of Periodicities for the Schools and Staffing Survey: Modeling and Analysis	Steven Kaufman
97-18	Improving the Mail Return Rates of SASS Surveys: A Review of the Literature	Steven Kaufman
97-22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
97-23	Further Cognitive Research on the Schools and Staffing Survey (SASS) Teacher Listing Form	Dan Kasprzyk
97-41	Selected Papers on the Schools and Staffing Survey: Papers Presented at the 1997 Meeting of the American Statistical Association	Steve Kaufman
97-42	Improving the Measurement of Staffing Resources at the School Level: The Development of Recommendations for NCES for the Schools and Staffing Survey (SASS)	Mary Rollefson
97-44	Development of a SASS 1993–94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98-01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
98-02	Response Variance in the 1993–94 Schools and Staffing Survey: A Reinterview Report	Steven Kaufman
98-04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
98-05	SASS Documentation: 1993–94 SASS Student Sampling Problems; Solutions for Determining the Numerators for the SASS Private School (3B) Second-Stage Factors	Steven Kaufman
98-08	The Redesign of the Schools and Staffing Survey for 1999–2000: A Position Paper	Dan Kasprzyk
98-12	A Bootstrap Variance Estimator for Systematic PPS Sampling	Steven Kaufman

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98-13	Response Variance in the 1994–95 Teacher Follow-up Survey	Steven Kaufman
98-14	Variance Estimation of Imputed Survey Data	Steven Kaufman
98-15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
98-16	A Feasibility Study of Longitudinal Design for Schools and Staffing Survey	Stephen Broughman
1999-02	Tracking Secondary Use of the Schools and Staffing Survey Data: Preliminary Results	Dan Kasprzyk
1999-04	Measuring Teacher Qualifications	Dan Kasprzyk
1999-07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
1999-08	Measuring Classroom Instructional Processes: Using Survey and Case Study Fieldtest Results to Improve Item Construction	Dan Kasprzyk
1999-10	What Users Say About Schools and Staffing Survey Publications	Dan Kasprzyk
1999-12	1993–94 Schools and Staffing Survey: Data File User's Manual, Volume III: Public-Use Codebook	Kerry Gruber
1999-13	1993–94 Schools and Staffing Survey: Data File User's Manual, Volume IV: Bureau of Indian Affairs (BIA) Restricted-Use Codebook	Kerry Gruber
1999-14	1994–95 Teacher Followup Survey: Data File User's Manual, Restricted-Use Codebook	Kerry Gruber
1999-17	Secondary Use of the Schools and Staffing Survey Data	Susan Wiley
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2000-10	A Research Agenda for the 1999–2000 Schools and Staffing Survey	Dan Kasprzyk
2000-13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber

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96-20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96-22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
98-03	Adult Education in the 1990s: A Report on the 1991 National Household Education Survey	Peter Stowe
98-10	Adult Education Participation Decisions and Barriers: Review of Conceptual Frameworks and Empirical Studies	Peter Stowe
1999-11	Data Sources on Lifelong Learning Available from the National Center for Education Statistics	Lisa Hudson
2000-16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
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American Indian – education		
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Assessment/achievement		
95-12	Rural Education Data User's Guide	Samuel Peng
95-13	Assessing Students with Disabilities and Limited English Proficiency	James Houser
97-29	Can State Assessment Data be Used to Reduce State NAEP Sample Sizes?	Larry Ogle
97-30	ACT's NAEP Redesign Project: Assessment Design is the Key to Useful and Stable Assessment Results	Larry Ogle
97-31	NAEP Reconfigured: An Integrated Redesign of the National Assessment of Educational Progress	Larry Ogle
97-32	Innovative Solutions to Intractable Large Scale Assessment (Problem 2: Background Questions)	Larry Ogle
97-37	Optimal Rating Procedures and Methodology for NAEP Open-ended Items	Larry Ogle
97-44	Development of a SASS 1993–94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98-09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
Beginning students in postsecondary education		
98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
Civic participation		
97-25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
Climate of schools		
95-14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
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Course-taking		
95-12	Rural Education Data User's Guide	Samuel Peng
98-09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
1999-05	Procedures Guide for Transcript Studies	Dawn Nelson
1999-06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
Crime		
97-09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
Curriculum		
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98-09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
Customer service		
1999-10	What Users Say About Schools and Staffing Survey Publications	Dan Kasprzyk
2000-02	Coordinating NCES Surveys: Options, Issues, Challenges, and Next Steps	Valena Plisko
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
Data quality		
97-13	Improving Data Quality in NCES: Database-to-Report Process	Susan Ahmed
Data warehouse		
2000-04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
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2000-03	Strengths and Limitations of Using SUDAAN, Stata, and WesVarPC for Computing Variances from NCES Data Sets	Ralph Lee
Dropout rates, high school		
95-07	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
Early childhood education		
96-20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
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97-36	Measuring the Quality of Program Environments in Head Start and Other Early Childhood Programs: A Review and Recommendations for Future Research	Jerry West
1999-01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West
Educational attainment		
98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
Educational research		
2000-02	Coordinating NCES Surveys: Options, Issues, Challenges, and Next Steps	Valena Plisko
Employment		
96-03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings

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98-11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
2000-16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
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Engineering		
2000-11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Faculty – higher education		
97-26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
2000-01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
Finance – elementary and secondary schools		
94-05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
96-19	Assessment and Analysis of School-Level Expenditures	William J. Fowler, Jr.
98-01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
1999-07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
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Finance – postsecondary		
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Finance – private schools		
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EFF-089 (3/2000)